

**DECISION RECORD
FOR
Anadarko Oil & Gas INC.
Table Mountain Phase 2 Federal POD
ENVIRONMENTAL ASSESSMENT –WY-070-10376**

DECISION:

BLM’s decision is to approve Anadarko Oil & Gas INC. (APC) Table Mountain Phase 2 Federal POD Coal Bed Natural Gas (CBNG) POD Alternative B of the attached Environmental Assessment (EA). Alternative B is the Modified Proposed Action, and is the result of collaboration between the Bureau of Land Management and Anadarko Oil & Gas INC.. Alternative B has been analyzed in the attached EA and found to have no significant impacts on the human environment, beyond those described in the Powder River Basin Final Environmental Impact Statement (PRB FEIS) thus an EIS is not required.

Details of the approval are summarized below. The project description, including specific changes made at the onsites, and site-specific mitigation measures, is included in the attached EA and Appendix A: Conditions of Approval for the Application for Permit to Drill.

Well Sites:

The following 86 Applications for Permit to Drill (APDs) and associated infrastructure are authorized:

	Well Name	Well #	QTR	Sec	TWN	RNG	Lease
1	TABLE MOUNTAIN 2 TM CBM	1-12*	SWNW	1	44N	77W	WYW13956
2	TABLE MOUNTAIN 2 TM CBM	1-32	SWNE	1	44N	77W	WYW13956
3	TABLE MOUNTAIN 2 TM CBM	1-34	SWSE	1	44N	77W	WYW52285
4	TABLE MOUNTAIN 2 TM CBM	1-43	NESE	1	44N	77W	WYW52285
5	TABLE MOUNTAIN 2 TM CBM	2-12	SWNW	2	44N	77W	WYW13956
6	TABLE MOUNTAIN 2 TM CBM	2-32	SWNE	2	44N	77W	WYW52285
7	TABLE MOUNTAIN 2 TM CBM	3-32	SWNE	3	44N	77W	WYW13956
8	TABLE MOUNTAIN 2 TM CBM	3-12	SWNW	3	45N	76W	WYW51703
9	TABLE MOUNTAIN 2 TM CBM	3-14	SWSW	3	45N	76W	WYW72485
10	TABLE MOUNTAIN 2 TM CBM	3-21	NENW	3	45N	76W	WYW0309257
11	TABLE MOUNTAIN 2 TM CBM	3-23	NESW	3	45N	76W	WYW51704
12	TABLE MOUNTAIN 2 TM CBM	3-32	SWNE	3	45N	76W	WYW51703
13	TABLE MOUNTAIN 2 TM CBM	3-34	SWSE	3	45N	76W	WYW51704
14	TABLE MOUNTAIN 2 TM CBM	3-41	NENE	3	45N	76W	WYW51703
15	TABLE MOUNTAIN 2 TM CBM	3-43	NESE	3	45N	76W	WYW51703
16	TABLE MOUNTAIN 2 TM CBM	6-12	SWNW	6	45N	76W	WYW0266651
17	TABLE MOUNTAIN 2 TM CBM	6-14	SWSW	6	45N	76W	WYW0266651
18	TABLE MOUNTAIN 2 TM CBM	6-21	NENW	6	45N	76W	WYW0266651
19	TABLE MOUNTAIN 2 TM CBM	6-23	NESW	6	45N	76W	WYW0266651
20	TABLE MOUNTAIN 2 TM CBM	6-41	NENE	6	45N	76W	WYW0266651

	Well Name	Well #	QTR	Sec	TWN	RNG	Lease
21	TABLE MOUNTAIN 2 TM CBM	7-12	SWNW	7	45N	76W	WYW0266651
22	TABLE MOUNTAIN 2 TM CBM	7-21	NENW	7	45N	76W	WYW0266651
23	TABLE MOUNTAIN 2 TM CBM	11-12	SWNW	11	45N	76W	WYW5955
24	TABLE MOUNTAIN 2 TM CBM	18-14	SWSW	18	45N	76W	WYW89851
25	TABLE MOUNTAIN 2 TM CBM	18-21	NENW	18	45N	76W	WYW89851
26	TABLE MOUNTAIN 2 TM CBM	18-23	NESW	18	45N	76W	WYW89851
27	TABLE MOUNTAIN 2 TM CBM	21-14	SWSW	21	45N	76W	WYW41473
28	TABLE MOUNTAIN 2 TM CBM	21-23	NESW	21	45N	76W	WYW41473
29	TABLE MOUNTAIN 2 TM CBM	22-12	SWNW	22	45N	76W	WYW21220
30	TABLE MOUNTAIN 2 TM CBM	22-14	SWSW	22	45N	76W	WYW41473
31	TABLE MOUNTAIN 2 TM CBM	22-23	NESW	22	45N	76W	WYW41473
32	TABLE MOUNTAIN 2 TM CBM	27-32	SWNE	27	45N	76W	WYW89859
33	TABLE MOUNTAIN 2 TM CBM	27-41	NENE	27	45N	76W	WYW89859
34	TABLE MOUNTAIN 2 TM CBM	28-14	SWSW	28	45N	76W	WYW89852
35	TABLE MOUNTAIN 2 TM CBM	28-23	NESW	28	45N	76W	WYW89852
36	TABLE MOUNTAIN 2 TM CBM	28-32	SWNE	28	45N	76W	WYW0266653
37	TABLE MOUNTAIN 2 TM CBM	28-41	NENE	28	45N	76W	WYW0266653
38	TABLE MOUNTAIN 2 TM CBM	1-43	NESE	1	45N	77W	WYW89851
39	TABLE MOUNTAIN 2 TM CBM	2-12	SWNW	2	45N	77W	WYW128454
40	TABLE MOUNTAIN 2 TM CBM	2-21	NENW	2	45N	77W	WYW128454
41	TABLE MOUNTAIN 2 TM CBM	3-12	SWNW	3	45N	77W	WYW128465
42	TABLE MOUNTAIN 2 TM CBM	3-14	SWSW	3	45N	77W	WYW128454
43	TABLE MOUNTAIN 2 TM CBM	3-23	NESW	3	45N	77W	WYW128454
44	TABLE MOUNTAIN 2 TM CBM	3-32	SWNE	3	45N	77W	WYW128465
45	TABLE MOUNTAIN 2 TM CBM	3-34	SWSE	3	45N	77W	WYW128454
46	TABLE MOUNTAIN 2 TM CBM	3-41	NENE	3	45N	77W	WYW128454
47	TABLE MOUNTAIN 2 TM CBM	3-43	NESE	3	45N	77W	WYW128454
48	TABLE MOUNTAIN 2 TM CBM	4-12	SWNW	4	45N	77W	WYW128454
49	TABLE MOUNTAIN 2 TM CBM	4-21	NENW	4	45N	77W	WYW128454
50	TABLE MOUNTAIN 2 TM CBM	4-23	NESW	4	45N	77W	WYW128454
51	TABLE MOUNTAIN 2 TM CBM	4-32	SWNE	4	45N	77W	WYW128454
52	TABLE MOUNTAIN 2 TM CBM	4-34	SWSE	4	45N	77W	WYW128454
53	TABLE MOUNTAIN 2 TM CBM	4-41	NENE	4	45N	77W	WYW128454
54	TABLE MOUNTAIN 2 TM CBM	4-43	NESE	4	45N	77W	WYW128454

	Well Name	Well #	QTR	Sec	TWN	RNG	Lease
55	TABLE MOUNTAIN 2 TM CBM	9-14	SWSW	9	45N	77W	WYW128454
56	TABLE MOUNTAIN 2 TM CBM	9-23	NESW	9	45N	77W	WYW128454
57	TABLE MOUNTAIN 2 TM CBM	9-34	SWSE	9	45N	77W	WYW0275186
58	TABLE MOUNTAIN 2 TM CBM	9-41	NENE	9	45N	77W	WYW112974
59	TABLE MOUNTAIN 2 TM CBM	9-43	NESE	9	45N	77W	WYW0275186
60	TABLE MOUNTAIN 2 TM CBM	10-12	SWNW	10	45N	77W	WYW89853
61	TABLE MOUNTAIN 2 TM CBM	10-14	SWSW	10	45N	77W	WYW0275186
62	TABLE MOUNTAIN 2 TM CBM	10-21	NENW	10	45N	77W	WYW89853
63	TABLE MOUNTAIN 2 TM CBM	10-23	NESW	10	45N	77W	WYW0275186
64	TABLE MOUNTAIN 2 TM CBM	10-34	SWSE	10	45N	77W	WYW0275186
65	TABLE MOUNTAIN 2 TM CBM	10-41	NENE	10	45N	77W	WYW128464
66	TABLE MOUNTAIN 2 TM CBM	10-43	NESE	10	45N	77W	WYW0275186
67	TABLE MOUNTAIN 2 TM CBM	14-14	SWSW	14	45N	77W	WYW125418
68	TABLE MOUNTAIN 2 TM CBM	15-12	SWNW	15	45N	77W	WYW0275186
69	TABLE MOUNTAIN 2 TM CBM	15-21	NENW	15	45N	77W	WYW0275186
70	TABLE MOUNTAIN 2 TM CBM	15-32	SWNE	15	45N	77W	WYW0275186
71	TABLE MOUNTAIN 2 TM CBM	15-34	SWSE	15	45N	77W	WYW0275186
72	TABLE MOUNTAIN 2 TM CBM	15-43	NESE	15	45N	77W	WYW0275187
73	TABLE MOUNTAIN 2 TM CBM	27-14	SWSW	27	46N	76W	WYW20291
74	TABLE MOUNTAIN 2 TM CBM	27-23	NESW	27	46N	76W	WYW20291
75	TABLE MOUNTAIN 2 TM CBM	33-14	SWSW	33	46N	77W	WYW128454
76	TABLE MOUNTAIN 2 TM CBM	33-23	NESW	33	46N	77W	WYW146305
77	TABLE MOUNTAIN 2 TM CBM	33-34	SWSE	33	46N	77W	WYW128454
78	TABLE MOUNTAIN 2 TM CBM	33-43	NESE	33	46N	77W	WYW146305
79	TABLE MOUNTAIN 2 TM CBM	34-12	SWNW	34	46N	77W	WYW89865
80	TABLE MOUNTAIN 2 TM CBM	34-14	SWSW	34	46N	77W	WYW89865
81	TABLE MOUNTAIN 2 TM CBM	34-21	NENW	34	46N	77W	WYW89865
82	TABLE MOUNTAIN 2 TM CBM	34-23	NESW	34	46N	77W	WYW89865
83	TABLE MOUNTAIN 2 TM CBM	34-32	SWNE	34	46N	77W	WYW89865
84	TABLE MOUNTAIN 2 TM CBM	34-34	SWSE	34	46N	77W	WYW89865
85	TABLE MOUNTAIN 2 TM CBM	34-41	NENE	34	46N	77W	WYW89865
86	TABLE MOUNTAIN 2 TM CBM	34-43	NESE	34	46N	77W	WYW89865

Water Management:

The operator will inject CBNG produced water at their Midwest injection facility, Permit UIC 05-231, Class V:

	Injection Well	Qtr/Qtr	Section	TWP	RNG	Permit #
1	10MADSW13	NESW	13	40	79	05-231
2	15MADNW13	NENW	13	40	79	05-231
3	20MADSW12	SWSW	12	40	79	05-231
4	29MADNW12	SWNW	12	40	79	05-231
5	6MADNW12	NWNW	12	40	79	05-231

Rights-of-Way:

The following right-of-way locations were identified with the Table Mountain 2 POD for a road and/or road/utility corridor. Construction of the following locations is prohibited until authorized rights-of-ways have been issued for the following locations:

T. 45 N., R. 77 W., sec. 3, 4, 10, 11, 34;

T. 46 N., R. 77 W., sec. 33, 34, 35.

Denials:

The following 3 APDs and associated infrastructure are denied:

	Well Name	Well #	Sec	TWN	RNG	Environmental Issue/Justification
1	TABLE MOUNTAIN 2 TM CBM	27-14	27	45N	76W	Proximity to golden eagle nest, within ½ mile. For further detail see chapter 4, page 46 of the Table Mountain Phase 2 POD EA.
2	TABLE MOUNTAIN 2 TM CBM	27-23	27	45N	76W	Proximity to golden eagle nest, within ½ mile. For further detail see chapter 4, page 46 of the Table Mountain Phase 2 POD EA.
3	TABLE MOUNTAIN 2 TM CBM	21-12	21	45N	76W	Proximity to red-tail nest, within ¼ mile. For further detail see chapter 4, page 46 of the Table Mountain Phase 2 POD EA.

Pump Jacks will not be authorized for the Table Mountain Phase 2 POD. Insufficient information was given by the proponent to analyze pump jacks. For further detail please refer to the PRB EIS, chapter 2 page 2-24 (Well Production Facilities).

Operator Committed Measures:

The operator has incorporated several measures to alleviate resource impacts into their Master Surface Use Plan (MSUP), submitted on September 16, 2010. Refer to the MSUP page 1, for complete details of operator committed measures.

Site-specific Mitigation Measures:

Site-specific Conditions of Approval have been applied to this project, in addition to the programmatic and standard COAs identified in the PRB FEIS, to mitigate the site-specific impacts described in the Environmental Consequences section of the attached EA. For a complete description of all site-specific COA's associated with this approval, see Appendix A, in the attached EA.

COMPLIANCE WITH LAWS, REGULATIONS, LAND USE PLANS, AND POLICIES:

This approval is in compliance with all Federal laws, regulations, and policies. This includes, but is not limited to, the Federal Land Policy and Management Act, the National Historic Preservation Act, the Threatened and Endangered Species Act, the Migratory Bird Treaty Act, the Clean Water Act, the Clean Air Act, and the National Environmental Policy Act.

Approval of this alternative is in conformance with the *Powder River Basin Oil and Gas Project Environmental Impact Statement and Proposed Plan Amendment* (PRB FEIS), *Record of Decision and Resource Management Plan Amendments for the Powder River Basin Oil and Gas Project* (PRB FEIS ROD), and the Approved Resource Management Plan (RMP) for the Public Lands Administered by the Bureau of Land Management, Buffalo Field Office (BFO), (1985/2001).

This approval is subject to adherence with all of the operating plans, design features, and mitigation measures contained in the Master Surface Use Plan of Operations, Drilling Plan, Water Management Plan and information in individual APDs. This approval is also subject to operator compliance with all mitigation and monitoring requirements contained within the Powder River Oil and Gas Project Final Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS) approved April 30, 2003.

RATIONALE:

The decision to authorize the selected alternative, as summarized above, is based on the following:

1. Mitigation measures were included to reduce environmental impacts below the level of significance (FONSI) while still meeting the project's purpose and need. Mitigation is discussed in the environmental consequences section (4.2) of the attached EA. For a complete description of all site-specific COA's associated with this approval, see Appendix A, in the attached EA.
2. The selected alternative will not result in any undue or unnecessary environmental degradation.
3. The selected alternative will help meet the nation's energy needs, and help stimulate local economies by maintaining workforce stability.
4. The Operator, in their POD, has committed to:
 - Comply with all applicable Federal, State, and Local laws and regulations (MSUP pg. 1).
 - Obtain the necessary permits from other agencies for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits (MSUP pg. 40-41 and Self Certification).
 - Offer water well agreements to the owners of record for permitted water wells within ½ mile of a federal CBNG producing well in the POD (MSUP pg. 40).
 - Provide water analysis from a designated reference well in Big George coal zone (WMP pg. 13).
5. The Operator has certified that a Surface Use Agreement has been reached with the Landowners (Self Certification tab).
6. The selected alternative incorporates components of the Wyoming Governor's Sage Grouse Implementation Team's "core population area" strategy, the Governor's executive order, and local research to provide mitigation for sage-grouse, while meeting the purpose and need for the Table Mountain Phase 2 Federal POD.

ADMINISTRATIVE REVIEW AND APPEAL: Under BLM regulations, this decision is subject to administrative review in accordance with 43 CFR 3165. Any request for administrative review of this decision must include information required under 43 CFR 3165.3(b) (State Director Review), including all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management, P.O. Box 1828, Cheyenne, Wyoming 82003, no later than 20 business days after this Decision Record is received or considered to have been received.

Any party who is adversely affected by the State Director's decision may appeal that decision to the Interior Board of Land Appeals, as provided in 43 CFR 3165.4.

Field Manager: John A. [Signature] Date: 9/30/10

**FINDING OF NO SIGNIFICANT IMPACT
FOR
Anadarko Oil & Gas INC.
Table Mountain Phase 2 Federal POD
ENVIRONMENTAL ASSESSMENT –WY-070-10376**

FINDING OF NO SIGNIFICANT IMPACT:

On the basis of the information contained in the EA, and all other information available to me, it is my determination that: (1) the implementation of Alternative B will not have significant environmental impacts beyond those already addressed in PRB EIS to which the EA is tiered; (2) Alternative B is in conformance with the Buffalo Field Office Resource Management Plan (1985, 2001); and (3) Alternative B does not constitute a major federal action having a significant effect on the human environment. Therefore, an environmental impact statement or a supplement to the existing environmental impact statement is not necessary and will not be prepared.

This finding is based on my consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR '1508.27), both with regard to the context and to the intensity of the impacts described in the EA.

CONTEXT:

Mineral development (coal, oil and gas, bentonite, and uranium) is a long-standing and common land use within the Powder River Basin. More than one fourth of the nation's coal production comes from the Powder River Basin. The PRB FEIS reasonably foreseeable development predicted and analyzed the development of 51,000 CBNG wells and 3,200 oil wells (PRB FEIS ROD pg. 2). The additional CBNG development described in Alternative B is insignificant within the national, regional, and local context.

INTENSITY:

The implementation of Alternative B will result in beneficial effects in the forms of energy and revenue production, however; there will also be adverse effects to the environment (EA sec. 4). Design features and mitigation measures have been included within Alternative B to prevent significant adverse environmental effects (EA sec. 2.2).

The preferred alternative does not pose a significant risk to public health and safety. The geographic area of the POD does not contain unique characteristics identified within the 1985 RMP, 2003 PRB FEIS, or other legislative or regulatory processes.

Relevant scientific literature and professional expertise were used in preparing the EA. The scientific community is reasonably consistent with their conclusions on environmental effects relative to oil and gas development. Research findings on the nature of the environmental effects are not highly controversial, highly uncertain, or involve unique or unknown risks.

CBNG development of the nature proposed with this POD and similar PODs was predicted and analyzed in the PRB FEIS; the selected alternative does not establish a precedent for future actions with significant effects.

There are no cultural or historical resources present that will be adversely affected by the selected alternative (EA sec. 4.2.6.1). No species listed under the Endangered Species Act or their designated critical habitat will be adversely affected (EA sec. 4.2.3.1). The selected alternative will not have any anticipated effects that would threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment

Field Office Manager: 

Date: 9/30/10

**BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
ENVIRONMENTAL ASSESSMENT (EA)
FOR
Anadarko Oil & Gas INC.
Table Mountain Phase 2 Federal POD
COALBED NATURAL GAS PLAN OF DEVELOPMENT
WY-070-10376**

1. INTRODUCTION

This site-specific analysis tiers into and incorporates by reference the information and analysis contained in the Powder River Basin Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS), #WY-070-02-065 (approved April 30, 2003), pursuant to 40 CFR 1508.28 and 1502.21. This document is available for review at the BLM Buffalo Field Office (BFO). This project environmental assessment (EA) addresses site-specific resources and impacts that were not covered within the PRB FEIS.

1.1. Background

Anadarko Oil & Gas INC. submitted the Table Mountain Phase 2 Federal POD on February 24, 2010 to the BFO with 89 Federal APD's to develop and produce natural gas resources within coal bearing formations of the Powder River Basin (PRB).

- June 28, 2010: The Operator Information Meeting (OIM) was conducted.
- July 7, 8, 12-16, 20, 22, and the 27, 2010: Project on-site reviews were held for Table Mountain Phase 2 Federal POD. For further detail in regards to the onsite and changes made at the onsite please refer to the section labeled Onsite Notes within the Table Mountain Phase 2 Federal POD. Personnel attending the field inspections are identified in section 5 Consultation and Coordination.
- August 10, 2010: Post onsite deficiency letter sent out by BLM for the Table Mountain Phase 2 Federal POD.
- August 17, 2010: A meeting to discuss the results of the project on-site reviews was held for Table Mountain Phase 2 Federal POD.
- September 16, 2010: Anadarko Oil & Gas INC. responded to the deficiency letter for Table Mountain Phase 2 Federal POD.
- September 23, 2010: The operator was notified that upon further analysis 3 wells were being denied from the proposed project due to wells being in close proximity to a golden eagle nest and a red-tailed hawk nest.
- September 27, 2010: Proposed COAs were shared with the operator.

As a result of these discussions, the following adjustments were made to the initially proposed project:

- A total of 23 well pads and 20 slots were proposed in the original proposal. As a result of the onsite field review and concerns from APC's drilling staff in regards to safety, cross slope on locations, and rigs having to be completely on natural ground; the new proposal consists of 35 well pads and 30 slots. The operator has submitted in conjunction with the new pad designs and slot designs a detailed reclamation plan to alleviate and address reclamation and stabilization concerns.

- Roads were relocated or engineered to: reduce overall surface disturbance and limit soil erosion.

1.2. Purpose and Need for the Proposed Action

The purpose of the proposed action is to explore, develop, and produce oil and gas reserves conducted under the rights granted by a Federal oil and gas lease, as required in 43 CFR 3160, all Onshore Orders, and The Mineral Leasing Act, as amended and supplemented, (30 U.S.C. 181 et seq.).

The need for the action is the requirement to obtain approval for the development of an Oil and Gas Lease through an Application for Permit to Drill (APD) on public lands managed by the Bureau of Land Management under Onshore Order No. 1, pursuant to the authority of the Mineral Leasing Act, as amended and supplemented, (30 U.S.C. 181 et seq.) and prescribed in 43 CFR Part 3160.

1.3. Decision to be Made

Decision to be Made: The BLM will decide whether or not to approve the proposed development of oil and gas resources on the federal leasehold, and if so, under what terms and conditions.

1.4. Conformance with Land Use Plan and Other Applicable Laws, Regulations, and Policies

The proposed action conforms to the terms and the conditions of the 1985 Buffalo RMP and the 2003 PRB FEIS & RMP Amendment. The proposed action is in compliance with all Federal laws, regulations, and policies. This includes, but is not limited to, the Federal Land Policy and Management Act (1976), the National Historic Preservation Act, the Endangered Species Act (1973), the Migratory Bird Treaty Act (1918), the Clean Water Act (1972), the Clean Air Act (1970), and the National Environmental Policy Act (1969).

1.5. Scoping and Issues

External scoping was not conducted for this EA. Extensive external scoping was conducted for the PRB FEIS and is discussed beginning on pg. 15 of the ROD and beginning on pg. 2-1 of the FEIS. This action is similar in scope to the numerous other CBNG PODs that BFO has analyzed; external scoping would be unlikely to identify new issues as was verified by the few POD EAs that were externally scoped such as the Clabaugh POD (WY-070-EA08-134) and Hollcroft/Stotts Draw POD (WY-070-EA07-021).

The BLM interdisciplinary team (ID team) conducted internal scoping by reviewing the proposed development and project location to identify potentially affected resource and land uses. Appendix B identifies those resources and land uses present and affected by the proposed action; those resources and land uses that are either not present, not affected, or were adequately covered by the PRB FEIS will not be discussed in this EA. The ID team identified significant issues for the affected resources to further focus the analysis. This EA addresses those site-specific impacts that were not disclosed within the PRB FEIS that would help in making a reasoned decision or may be related to a potentially significant effect. Issues for this project include:

- Soils and vegetation: site stability, reclamation potential, riparian and wetland communities, invasive species
- Geology and Land Use: locatable and leasable minerals, including potential interaction with uranium mining
- Wildlife: raptor productivity, burrowing owl nesting , and greater sage-grouse lek occupancy and persistency
- Cultural: Sites Eligible for the National Register of Historic Places: 48CA268, 48CA1480, 48CA1496,48CA7009
- Water: ground water depletion, quality and quantity of produced water

- Social and Economic: revenue potential, local economics.

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

Two alternatives, A and B, were evaluated. A brief description of each alternative is included in the following sections. Programmatic Mitigation Measures, as determined in PRB FEIS Record of Decision apply to all alternatives, including the No Action Alternative (Alternative A), and are included in Appendix A. Standard Mitigation Measures, Operator-committed Mitigation Measures, and site-specific Conditions of Approval (COAs) would apply only to action alternatives (Alternative B) and also are included in Appendix A.

2.1. Alternative A - No Action

A No Action Alternative was considered in the PRB FEIS, Volume 1, pages 2-54 through 2-62. This alternative would consist of no new federal wells. An oil and gas lease grants the lessee the “right and privilege to drill for, mine, extract, remove, and dispose of all oil and gas deposits” in the lease lands, “subject to the terms and conditions incorporated in the lease.” Thus, under this alternative, the operator’s proposal would be denied.

2.2. Alternative B - Operator Proposed Action

Alternative B contains complete APDs and is based on the operator and BLM working to reduce environmental impacts. This alternative summarizes the POD as it was finally, after site visits, submitted to the BLM by Anadarko Oil & Gas INC. on September 16, 2010.

Proposed Action Title/Type: Proposed Action Title/Type: Anadarko Oil & Gas INC.’s Table Mountain Phase 2 Federal CBNG POD.

Proposed Well Information: There are 89 wells proposed within this POD; the wells are vertical bores proposed on an 80 acre spacing pattern with 1 well per location from depths of 1,448-2,095 feet. Each well will produce from the Big George coal seam. Proposed well skid dimensions if the well is a producer are 8 ft wide x 8 ft length x 8 ft height. Dependent on water production rates the use of pumping units (Pump Jacks) may be implemented. The maximum height of the highest point of the proposed pumping unit is 10.5 ft. The base needed for the pumping unit measures 9.5 ft X 3 ft. Pumping units, if needed, would be used commencing three (3) to five (5) years into the well’s life, or once the rate of water production is typically less than one hundred barrels per day. Well infrastructure color is covert green, selected to blend with the surrounding vegetation. A list of proposed wells is included in Table 2.1.

Table 2.1 Proposed Wells – Alternative B

	Well Name	Well #	QTR	Sec	TWN	RNG	Lease
1	TABLE MOUNTAIN 2 TM CBM	1-12*	SWNW	1	44N	77W	WYW13956
2	TABLE MOUNTAIN 2 TM CBM	1-32	SWNE	1	44N	77W	WYW13956
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8	TABLE MOUNTAIN 2 TM CBM	3-12	SWNW	3	45N	76W	WYW51703

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18	TABLE MOUNTAIN 2 TM CBM	6-21	NENW	6	45N	76W	WYW0266651
19	TABLE MOUNTAIN 2 TM CBM	6-23	NESW	6	45N	76W	WYW0266651
20	TABLE MOUNTAIN 2 TM CBM	6-41	NENE	6	45N	76W	WYW0266651
21	TABLE MOUNTAIN 2 TM CBM	7-12	SWNW	7	45N	76W	WYW0266651
22	TABLE MOUNTAIN 2 TM CBM	7-21	NENW	7	45N	76W	WYW0266651
23	TABLE MOUNTAIN 2 TM CBM	11-12	SWNW	11	45N	76W	WYW5955
24	TABLE MOUNTAIN 2 TM CBM	18-14	SWSW	18	45N	76W	WYW89851
25	TABLE MOUNTAIN 2 TM CBM	18-21	NENW	18	45N	76W	WYW89851
26	TABLE MOUNTAIN 2 TM CBM	18-23	NESW	18	45N	76W	WYW89851
27	TABLE MOUNTAIN 2 TM CBM	21-14	SWSW	21	45N	76W	WYW41473
28	TABLE MOUNTAIN 2 TM CBM	21-23	NESW	21	45N	76W	WYW41473
29	TABLE MOUNTAIN 2 TM CBM	22-12	SWNW	22	45N	76W	WYW21220
30	TABLE MOUNTAIN 2 TM CBM	22-14	SWSW	22	45N	76W	WYW41473
31	TABLE MOUNTAIN 2 TM CBM	22-23	NESW	22	45N	76W	WYW41473
32	TABLE MOUNTAIN 2 TM CBM	27-32	SWNE	27	45N	76W	WYW89859
33	TABLE MOUNTAIN 2 TM CBM	27-41	NENE	27	45N	76W	WYW89859
34	TABLE MOUNTAIN 2 TM CBM	28-14	SWSW	28	45N	76W	WYW89852
35	TABLE MOUNTAIN 2 TM CBM	28-23	NESW	28	45N	76W	WYW89852
36	TABLE MOUNTAIN 2 TM CBM	28-32	SWNE	28	45N	76W	WYW0266653
37	TABLE MOUNTAIN 2 TM CBM	28-41	NENE	28	45N	76W	WYW0266653
38	TABLE MOUNTAIN 2 TM CBM	1-43	NESE	1	45N	77W	WYW89851
39	TABLE MOUNTAIN 2 TM CBM	2-12	SWNW	2	45N	77W	WYW128454
40	TABLE MOUNTAIN 2 TM CBM	2-21	NENW	2	45N	77W	WYW128454
41	TABLE MOUNTAIN 2 TM CBM	3-12	SWNW	3	45N	77W	WYW128465
42	TABLE MOUNTAIN 2 TM CBM	3-14	SWSW	3	45N	77W	WYW128454
43	TABLE MOUNTAIN 2 TM CBM	3-23	NESW	3	45N	77W	WYW128454
44	TABLE MOUNTAIN 2 TM CBM	3-32	SWNE	3	45N	77W	WYW128465
45	TABLE MOUNTAIN 2 TM CBM	3-34	SWSE	3	45N	77W	WYW128454
46	TABLE MOUNTAIN 2 TM CBM	3-41	NENE	3	45N	77W	WYW128454
47	TABLE MOUNTAIN 2 TM CBM	3-43	NESE	3	45N	77W	WYW128454
48	TABLE MOUNTAIN 2 TM CBM	4-12	SWNW	4	45N	77W	WYW128454
49	TABLE MOUNTAIN 2 TM CBM	4-21	NENW	4	45N	77W	WYW128454

	Well Name	Well #	QTR	Sec	TWN	RNG	Lease
50	TABLE MOUNTAIN 2 TM CBM	4-23	NESW	4	45N	77W	WYW128454
51	TABLE MOUNTAIN 2 TM CBM	4-32	SWNE	4	45N	77W	WYW128454
52	TABLE MOUNTAIN 2 TM CBM	4-34	SWSE	4	45N	77W	WYW128454
53	TABLE MOUNTAIN 2 TM CBM	4-41	NENE	4	45N	77W	WYW128454
54	TABLE MOUNTAIN 2 TM CBM	4-43	NESE	4	45N	77W	WYW128454
55	TABLE MOUNTAIN 2 TM CBM	9-14	SWSW	9	45N	77W	WYW128454
56	TABLE MOUNTAIN 2 TM CBM	9-23	NESW	9	45N	77W	WYW128454
57	TABLE MOUNTAIN 2 TM CBM	9-34	SWSE	9	45N	77W	WYW0275186
58	TABLE MOUNTAIN 2 TM CBM	9-41	NENE	9	45N	77W	WYW112974
59	TABLE MOUNTAIN 2 TM CBM	9-43	NESE	9	45N	77W	WYW0275186
60	TABLE MOUNTAIN 2 TM CBM	10-12	SWNW	10	45N	77W	WYW89853
61	TABLE MOUNTAIN 2 TM CBM	10-14	SWSW	10	45N	77W	WYW0275186
62	TABLE MOUNTAIN 2 TM CBM	10-21	NENW	10	45N	77W	WYW89853
63	TABLE MOUNTAIN 2 TM CBM	10-23	NESW	10	45N	77W	WYW0275186
64	TABLE MOUNTAIN 2 TM CBM	10-34	SWSE	10	45N	77W	WYW0275186
65	TABLE MOUNTAIN 2 TM CBM	10-41	NENE	10	45N	77W	WYW128464
66	TABLE MOUNTAIN 2 TM CBM	10-43	NESE	10	45N	77W	WYW0275186
67	TABLE MOUNTAIN 2 TM CBM	14-14	SWSW	14	45N	77W	WYW125418
68	TABLE MOUNTAIN 2 TM CBM	27-14	SWSW	27	45N	76W	WYW41473
69	TABLE MOUNTAIN 2 TM CBM	15-12	SWNW	15	45N	77W	WYW0275186
70	TABLE MOUNTAIN 2 TM CBM	21-12	SWNW	21	45N	76W	WYW21220
71	TABLE MOUNTAIN 2 TM CBM	15-21	NENW	15	45N	77W	WYW0275186
72	TABLE MOUNTAIN 2 TM CBM	15-32	SWNE	15	45N	77W	WYW0275186
73	TABLE MOUNTAIN 2 TM CBM	15-34	SWSE	15	45N	77W	WYW0275186
74	TABLE MOUNTAIN 2 TM CBM	15-43	NESE	15	45N	77W	WYW0275187
75	TABLE MOUNTAIN 2 TM CBM	27-23	NESW	27	45N	76W	WYW41473
76	TABLE MOUNTAIN 2 TM CBM	27-14	SWSW	27	46N	76W	WYW20291
77	TABLE MOUNTAIN 2 TM CBM	27-23	NESW	27	46N	76W	WYW20291
78	TABLE MOUNTAIN 2 TM CBM	33-14	SWSW	33	46N	77W	WYW128454
79	TABLE MOUNTAIN 2 TM CBM	33-23	NESW	33	46N	77W	WYW146305
80	TABLE MOUNTAIN 2 TM CBM	33-34	SWSE	33	46N	77W	WYW128454
81	TABLE MOUNTAIN 2 TM CBM	33-43	NESE	33	46N	77W	WYW146305
82	TABLE MOUNTAIN 2 TM CBM	34-12	SWNW	34	46N	77W	WYW89865
83	TABLE MOUNTAIN 2 TM CBM	34-14	SWSW	34	46N	77W	WYW89865
84	TABLE MOUNTAIN 2 TM CBM	34-21	NENW	34	46N	77W	WYW89865
85	TABLE MOUNTAIN 2 TM CBM	34-23	NESW	34	46N	77W	WYW89865
86	TABLE MOUNTAIN 2 TM CBM	34-32	SWNE	34	46N	77W	WYW89865
87	TABLE MOUNTAIN 2 TM CBM	34-34	SWSE	34	46N	77W	WYW89865
88	TABLE MOUNTAIN 2 TM CBM	34-41	NENE	34	46N	77W	WYW89865
89	TABLE MOUNTAIN 2 TM CBM	34-43	NESE	34	46N	77W	WYW89865

The following right-of-way locations were identified with the Table Mountain 2 POD for a road and/or road/utility corridor.

- T. 45 N., R. 77 W., sec. 3, 4, 10, 11, 34;
- T. 46 N., R. 77 W., sec. 33, 34, 35.

Water Management Proposal: Anadarko proposes to pipe produced water from the POD through the Salt Creek Pipeline, to Midwest, Wyoming, where it will be reinjected into the Madison Aquifer. Table 2.2 includes the approved locations that have been permitted for reinjection, associated with UIC Permit #05-231.

Table 2.2 Injection Well locations, UIC Permit 05-231 – Alternative B

	Injection Well	Qtr/Qtr	Section	TWP	RNG	Permit #
1	10MADSW13	NESW	13	40	79	05-231
2	15MADNW13	NENW	13	40	79	05-231
3	20MADSW12	SWSW	12	40	79	05-231
4	29MADNW12	SWNW	12	40	79	05-231
5	6MADNW12	NWNW	12	40	79	05-231

County: Campbell & Johnson County

Applicant: Anadarko Oil & Gas INC.

Surface Owners: BLM, Edwin J. and Dixie Lee Streeter, John O. Christensen, Robert Frederick & Janet K. Christensen, & Larry Brubaker

Drilling and Construction:

- Drilling and construction activities are anticipated to be completed within two years, the term of an APD. Drilling and construction occurs year-round in the PRB. Weather may cause delays lasting several days but rarely do delays last multiple weeks. Timing limitations in the form of COAs and/or agreements with surface owners impose longer temporal restrictions on portions of this POD, but rarely do these restrictions affect an entire POD.
- Well metering shall be accomplished by telemetry and well visitation. For estimated well visitations please refer to Table 4, page 25 of the MSUP.
- A road network consisting of existing and proposed improved (i.e., template or engineered) roads and primitive roads, including use of appropriately sized culverts.
- No OHP is proposed for the project. All power will be buried. If a buried power line network is not completed before the wells are in production, then temporary diesel generators shall be placed at the 58 power drops (Please refer to Table 3 within the Table Mountain Phase 2 Federal POD Master Surface Use Plan, page 21 for further detail).
- A storage tank of 500 gallon capacity shall be located with each diesel generator. Generators are projected to be in operation for 24 months. Fuel deliveries are anticipated to be 3 times per week. Generator noise level is expected to be 100.5 decibels at 1 meter distance. For expected noise levels from generators please see page 4-335, table 4-75, of the Final Powder River Basin Oil and Gas EIS.

- Utility corridors including buried gas, water, and power line networks; a majority of the utility corridors are within or immediately adjacent to roadways.
- There are no proposed compression facilities.

For a detailed description of design features, construction practices and water management strategies associated with the proposed action, refer to the Master Surface Use Plan (MSUP), Drilling Plan and WMP in the POD and individual APDs. Also see the subject POD for maps showing the proposed well locations and associated facilities described above. More information on CBNG well drilling, production and standard practices also is available in the PRB FEIS, Volume 1, pages 2-9 through 2-40 (January 2003).

Implementation of committed mitigation measures contained in the MSUP, Drilling Program and WMP, in addition to the Standard COAs contained in the PRB FEIS Record of Decision Appendix A, are incorporated and analyzed in this alternative.

Operator Committed Measures

- The operator has submitted a POD Specific Reclamation Plan. For further detail please refer to Table Mountain Phase 2 POD Reclamation Plans for Wells, Roads, 8-31-2010.
- The operator has committed to the control of noxious weeds and species of concern using the following measures identified in their Integrated Pest Management Plan (IPMP) for the Table Mountain Phase 2 Federal POD:
 - Cultural
 - o Methods of control and prevention will be re-seeding, mulching, vehicle and equipment maintenance, and surface disturbance as detailed in the IPMP.
 - Physical
 - o Methods of control and prevention include physically mowing and hand pulling weeds (for small or new infestations).
 - Biological
 - o Biological methods of control and prevention such as domestic animal use and approved biological control agents will be used.
 - Chemical
 - o Herbicides are another method of control and prevention that may be used to treat weeds. The use of herbicides must be done in accordance with the existing Surface Use Agreement with the private surface owner.
 - Education
 - o Weed education awareness programs include; identifying weeds and reporting weed infestations to the project manager.
 - Preventive practices
 - o Certified weed-free seed mixtures will be used for re-seeding, and vehicles and equipment will be washed before leaving areas of known noxious weed infestations.

2.3. Alternatives Considered but Not Analyzed in Detail

The original POD for the Table Mountain Phase 2 Federal POD was submitted by Anadarko Oil & Gas

INC. on February 24, 2010 with 89 Federal APDs. A series of discussions and onsite visits occurred between BLM and Anadarko Oil & Gas INC. based on the initial project. Please refer to the Background section 1.1 for further detail.

The changes as documented in a revised project description provided as Anadarko Petroleum Corporation's response to BLM's deficiency letter resulted in a refined proposed project, which is discussed in this document as Alternative B. The initial POD, the post-onsite deficiency letter, and the company's response to the deficiency letter are included in the Project Administrative Record, available for review at the BLM Buffalo Field Office.

2.4. Summary of Alternatives

A summary of the infrastructure currently existing within the POD area (Alternative A), the infrastructure proposed by the operator (Alternative B).

Facility	Alternative A No Action Existing Number or Miles (acres)	Alternative B¹ Operator Proposal Proposed Number or Miles (acres)
Total CBNG Wells Well Locations ²	80 (16 acres)	89 (25.9 acres)
Constructed Pads Slotted		24 30
Nonconstructed		35
Conventional Oil Wells ³	10 (10 acres)	0
Injection Wells ⁴	6 (6 acres)	0
Compressors	3 (12.7 acres)	0
Ancillary Facilities (Staging/Storage Areas) ⁵	2 (6.1 acres)	0
Roads-Engineered <i>Without Utility Corridor</i>	0	0 miles (0 acre)
<i>With Utility Corridor</i>	54 miles ⁶ (325 acres)	3.8 miles (23.3 acres)
Roads-Template/Spot Upgrade <i>Without Utility Corridor</i>	Included with above (roads-engineered)	0 miles (0 acres)
<i>With Utility Corridor</i>		27.7 miles (168 acres)
Roads-Primitive or two-track <i>Without Utility Corridor</i>	38 miles ⁷ (159.5 acres)	0 miles (0 acre)
<i>With Utility Corridor</i>	0 eat	0 miles (0 acres)
Utility Corridors <i>Adjacent to existing roads</i> ⁸	Unknown	17.2 miles (112 acres)
<i>Cross-country</i>		3.8 miles (16.3 acres)
Power lines-Overhead	41 miles (149.4 acres)	0
TOTAL ACRES DISTURBANCE	684.7	345.5

*This is a highly developed area, the operator was able to utilize existing structure, but due to engineering requirements, upgrades had to be made for safety, drainage, and reclamation. The total area disturbed is a combination of Alternative A and Alternative B for a total of 1030.2 acres.

- ¹ Acres or mileage within the action alternatives represent additional facilities and do not include the existing facilities.
- ² Data not available for well site type for existing wells; assume 0.2 acre of disturbance per CBNG well.
- ³ Assumes 1.0 acre of disturbance per conventional oil well.
- ⁴ Assumes 1.0 acre of disturbance per injection well.
- ⁵ Data limited to Anadarko's proposal only, which includes use of two existing staging area Anadarko also proposes use of existing oil well pads as staging areas; this acreage is included above.
- ⁶ Data includes all existing infrastructure and permitted Williams Production infrastructure to be shared in the Table Mountain 2 POD. Data does not differentiate between with and without utility corridor; existing width assumed to be 40 feet wide
- ⁷ Data includes all existing infrastructure and permitted Williams Production infrastructure to be shared in the Table Mountain 2 POD. Data does not differentiate between with and without utility corridor; existing width assumed to be 35 feet wide
- ⁸ Includes utility corridors proposed along existing primitive roads, and along existing improved roads.

3. DESCRIPTION OF AFFECTED ENVIRONMENT

This section describes the environment that would be affected by implementation of the alternatives described in Section 2. Aspects of the affected environment described in this section focus on the relevant major issues. A screening of all resources and land uses potentially affected is included in Appendix B. Resources that would be unaffected, or not affected beyond the level analyzed within the PRB FEIS, are not discussed within the EA.

3.1. Project Area Description

APC's Table Mountain Phase 2 Federal POD is located in western Johnson County and eastern Campbell County, 34 miles south of Gillette, Wyoming on US Highway 50. The POD lies approximately 11 miles southwest of Savageton, WY, on the Black and Yellow Road and would be developed within an area of approximately 28,157 acres. The topography consists of moderately rough terrain with many ridges and deep draws. The elevation within the project area ranges from approximately 4,700 to 5,240 feet above sea level.

3.1.1. Land Use

Livestock grazing has been the primary historic land use within the project area. Oil development, existing fee developments, CBNG, and ranching operations are the current land uses.

3.1.2. Geologic Features and Mineral Resources

There are no gravel pits within the Table Mountain Phase 2 Federal POD boundaries. North Butte of the Pumpkin Buttes lies southeast of the project area. Willow Creek transverses the western half of the project area on a southeast to northwest orientation.

Uranium, a locatable mineral, is regulated under the General Mining Law of 1872 and is explored for and commercially produced in Campbell and Johnson counties. Fluid leasable minerals within the project area include oil and gas; currently, 280 oil and gas fields exist in Campbell County, and 42 exist in Johnson County (BLM 2010a). Commercially viable salable minerals that are explored, developed, and disposed of under the Materials Act of 1947 include sand and gravel (BLM 2010a).

Uranium-bearing deposits typically are formed in fine-grained sandstones where reducing conditions dominate. Wasatch Formation sandstones have been identified as uranium-bearing within the project area (BLM 2009). Open-pit uranium mining has not occurred in Wyoming since 1991; the current method of uranium mining used is in-situ recovery (ISR) (Wyoming State Geological Survey [WSGS] 2010a). The

ISR method involves the injection of oxygenated water into the subsurface for solubilization of the uranium, creating a uranium-bearing groundwater that is then pumped to the surface. At the surface, the uranium is extracted from the water via ion exchange (Uranium Producers of America 2010). As of 2006, active uranium leases covered over half of the surface within the project area (BLM 2006). The Irigary In-situ Uranium Mine is near the northwest corner of the project area. Additional in-situ well fields are located near the southern boundary of the project area as well.

3.2. Soils, Vegetation, and Ecological Sites

3.2.1. Soils

Soils have developed in alluvium and residuum derived from the Wasatch Formation. Lithology consists of light to dark yellow and tan siltstone and sandstones with minor coal seams. Soils surface and subsurface textures vary widely from clay loams to sands. Soil depths vary from deep on lesser slopes to shallow and very shallow on steeper slopes. Soils are generally productive, though varies with texture, slope and other characteristics. Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 0 to 4 inches on ridges and shallow soils to 8+ inches in bottomland. Erosion potential varies from moderate to severe depending on the soil texture, vegetative cover and slope. Reclamation potential of soils also varies throughout the project area. The main soil limitations in the project area include: depth to bedrock, low available water holding capacity (sandy soils), low organic matter content, and high erosion potential.

Soils within the project area were identified from the *South Campbell (WY605) and South Johnson (WY619) County Survey Areas, Wyoming*. The soil survey was performed by the Natural Resource Conservation Service according to National Cooperative Soil Survey standards. The BLM used county soil survey information to predict soil behavior, limitations, or suitability for a given activity or action. The agency’s long term goal for soil resource management is to maintain, improve, or restore soil health and productivity, and to prevent or minimize soil erosion and compaction. Soil management objectives are to ensure that adequate soil protection is consistent with the resource capabilities. Many of the soils and landforms of this area present distinct challenges for development, and /or eventual site reclamation.

Soils having poor reclamation suitability comprise 66% of the POD area. The proponent planned their project and the BLM made further recommendations at the onsite to avoid those areas where possible, but disturbances within these areas will require a site specific reclamation COA. Overcoming the unfavorable properties or limitations requires special design, extra maintenance, and costly alteration.

The map unit symbols within this project area were filtered and map units representing 3.0% or greater in extent within the pod boundary are displayed. Dominant soil map units are listed in the table below with their individual acreage and percentage of the area within the POD boundary.

Table 3.1 Dominate soils affected by the proposed action include:

Map Unit	Map Unit Name	Acres	Percent
SNe	Shingle-Tassel association	10418.3	39%
233	Ustic Torriorthents, gullied	2096.3	8%
VC	Valent-Cushman association	1102.2	4%
210	Shingle-Taluce complex, 3 to 30 percent slopes	946.4	4%
SNb	Shingle-Cushman association	775.9	3%

Map Unit	Map Unit Name	Acres	Percent
217	Theedle-Shingle loams, 3 to 30 percent slopes	693.9	3%
146	Forkwood-Cushman loams, 0 to 6 percent slopes	673.5	3%

For more detailed soil information, see the NRCS Soil Survey (WY605 and WY619). Additional site specific soil information is included in the Ecological Site interpretations.

3.2.1.1. Soils Susceptible to Erosion

Loss in productivity is likely to occur on most soils if erosion continues unchecked. Because soil formation is a very slow process, most soils cannot renew their eroded surface while erosion continues. The development of a favorable rooting zone by the weathering of parent rock is much slower than development of the surface horizon. One estimate of this renewal rate is 0.5 ton per acre per year for unconsolidated parent materials and much less for consolidated materials. These very slow renewal rates support the philosophy that any soil erosion is too much. Loss of organic matter, resulting from erosion and tillage, is one of the primary causes for reduction in production yields. As organic matter decreases, soil aggregate stability, the soil's ability to hold moisture, and the cation exchange capacity decline. (Soil Quality-Agronomy Technical Note #7, USDA, Aug 1998)

Approximately 3,000 acres of the area within the Table Mountain Phase 2 POD boundary contain soil mapping units with a named soil component identified as being highly erosive due to wind or water erosion. Approximately 900 acres of the project area has slopes of 25% or more. Areas of slighter slopes and area near drainages usually have deeper soils. Deeper soils tend to have a higher probability of supporting shrubbrush grassland communities. On surfaces with steep topography, vegetation is sparse or even barren. Barren steep slopes experience higher velocity of water movement during heavy storm events. As this storm water moves down slope the velocity is mitigated by thicker vegetation of the sagebrush grasslands. Road and pipeline construction removes vegetation that controls water velocity. This loss of vegetative buffer increases water velocity and head cutting.

Soils with slopes of less than 25% may also be prone to high erosion because of the soil type, particle size, texture, or amount of organic matter. Other contributing factors to slope stability include slope length, slope aspect, and colluvium. Slope length has considerable control over runoff and potential accelerated water erosion. Slope aspect is the direction which the surface of the soil faces. Slope aspect may affect soil temperature, evapotranspiration, wind contact and soil moisture. Colluvium is poorly sorted debris that has accumulated at the base of slopes, in depressions, or along small streams through gravity, soil creep, and local wash. It consists largely of material that has rolled, slid or fallen down the slope under the influence of gravity. The rock fragments in colluvium are usually angular, in contrast to the rounded, water-worn cobbles and stones in alluvium and glacial outwash. These factors in combination with slope determine soil stability and the potential for mass soil movement.

Approximately 2,000 acres of the project area has soils classified as Ustic Torriorthents, gullied. This soil map unit is classified at the subgroup level of soil taxonomy, indicating a wide range in soil properties making soil suitability's, limitations and interpretations difficult to predict. The gullied phase is used for areas having gullies so deep that intensive measures, including reshaping, are required to reclaim the soil. No ecological site is assigned to the map unit (Soil Survey Manual Soil Survey Division Staff 1993).

3.2.1.2. Reclamation Potential

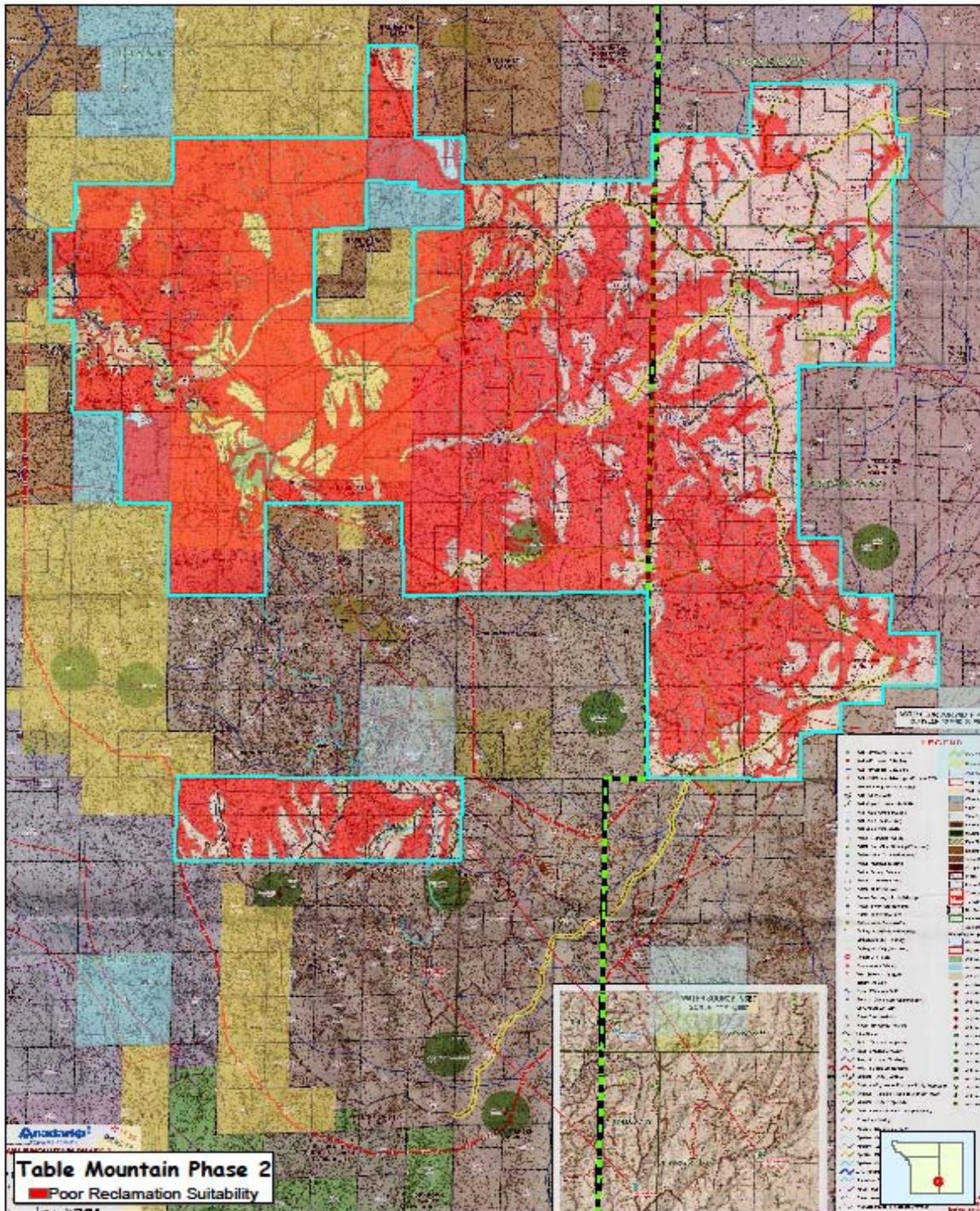
Soils with poor reclamation and re-vegetation suitability occur throughout the project area as shown in Table 3.2. Currently, soil conditions in the project area are being impacted by CBNG development as well

as traditional activities, including livestock grazing and wildlife use. Much of the area is covered with soils that are easily damaged by use or disturbance or are difficult to revegetate or otherwise reclaim. Soil impacts (e.g., roads, linear pipeline scars, and artificial wet areas) can be readily observed in the area. This high erosion potential could result in higher suspended sediment and turbidity levels in the Powder River.

In the absence of recoverable topsoil as is common throughout the project area, the surface organic matter in the form of vegetation, litter and biological crust are critical to maintaining the integrity and viability of the soil.

Reclamation potential of soils varies throughout the project area. The main soil limitations in the project area include: depth to bedrock, low organic matter content, low water holding capacity (sandy soils), and high erosion potential especially in areas of steep slopes. Many of the soils and landforms of this area present distinct challenges for development by making stabilization of disturbances and reclamation challenging. The POD has 66% the area identified as having a poor reclamation suitability, which has been mitigated by well moves, design alterations and a pod specific reclamation plan.

Table 3.2 Reclamation Suitability within the Table Mountain Phase 2 Project Area



3.2.2. Vegetation

3.2.2.1. General Description

Species typical of short grass prairie comprise the project area flora. Three major vegetation and habitat types occur within the project area including Mixed-grass prairie, Sagebrush grassland, and Junipers. Differences in dominant species within the project area vary with soil type, aspect and topography. The

dominant species include Wyoming big sagebrush (*Artemisia tridentata* var. *wyomingensis*), and silver sagebrush (*Artemisia cana*) mixed with various types of grasses. Some Rocky Mountain juniper (*Juniperus scopulorum*) is present. Junipers are not found in large numbers and are only found in some draws on north facing aspects. Plains cottonwoods (*Populus deltoids*) is also evident in some of the draw bottoms throughout the project area.

3.2.2.2. Wetlands/Riparian

Wetland vegetation is sparse within the TM 2 POD development. The area is interspersed with incised ephemeral drainages which contain isolated small areas with riparian type vegetation, in particular isolated cottonwoods.

3.2.2.3. Invasive Species

A database containing invasive species locations and other data is maintained by the Wyoming Energy Resource Information Clearinghouse (WERIC). The WERIC database was created cooperatively by the University of Wyoming, BLM and county Weed and Pest offices. The following state-listed noxious weeds and/or weed species of concern infestations were discovered by a search of the WERIC database (www.weric.info):

Specific species of concern include:

- Canada thistle is found throughout the POD.
- Scotch thistle was identified and found near existing roads and oil infrastructure throughout the POD.
- Salt Cedar which is located in certain drainages within the POD boundary.
- Buffalobur is found throughout the POD.
- Wild Licorice is found throughout the POD.
- Cheat grass has invaded the state of Wyoming, and has been identified occurring throughout the project area.

The state-listed noxious weeds are listed in PRB FEIS Table 3-21 (p. 3-104) and the Weed Species of Concern are listed in Table 3-22 (p. 3-105).

3.2.3. Ecological Sites

Ecological Site Descriptions are used to provide site and vegetation information needed for resource identification, management and reclamation recommendations. To determine the appropriate Ecological Sites for the area contained within this proposed action, BLM specialists analyzed data from onsite field reconnaissance and Natural Resources Conservation Service published soil survey soils information.

The map unit symbols for the soils identified above and the associated ecological sites for the identified soil map unit symbols found within the POD boundary are listed in the table below.

Table 3.3 Map Units and Ecological Sites

Map Unit	Ecological Site
SNe	SHALLOW LOAMY (10-14NP)
233	
VC	SANDS (10-14NP)
210	SHALLOW LOAMY (10-14NP)
SNb	SHALLOW LOAMY (10-14NP)
217	LOAMY (10-14NP)
146	LOAMY (10-14NP)

Dominant Ecological Sites and Plant Communities identified in this POD and its infrastructure are predominately Shallow Loamy and Sands sites.

Shallow Loamy sites occur on steep slopes and ridge tops, but may occur on all slopes, on landforms which include hill sides, ridges and escarpments in the 10-14 inch precipitation zone. These soils are shallow (less than 20" to bedrock) well-drained soils formed in alluvium over residuum or residuum derived from sandstone and shale. These soils have moderate permeability and may occur on all slopes. The bedrock may be any kind which is virtually impenetrable to plant roots, except igneous. The main soil limitations include the depth to bedrock. The present plant community is a Mixed Sagebrush/Grass. Wyoming big sagebrush is a significant component of this Mixed Sagebrush/Grass plant community.

Cool-season mid-grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs. Dominant grasses include bluebunch wheatgrass, rhizomatous wheatgrass, blue grama, and little bluestem. Other grasses occurring include Cusick's and Sandberg bluegrass, and prairie junegrass. Cheatgrass has invaded. Other vegetative species identified at onsite include: pricklypear and fringed sagewort.

Loamy Sites occur on gently undulating to rolling land on landforms which include hill sides, alluvial fans, ridges and stream terraces, in the 10-14 inch precipitation zone. These soils are moderately deep to very deep (greater than 20" to bedrock), well drained soils that formed in alluvium and residuum derived from sandstone and shale. These soils have moderate permeability. The present plant community is a Mixed Sagebrush/Grass. Wyoming big sagebrush is a major component of this Mixed Sagebrush/Grass plant community. Cool-season mid-grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs.

Sand sites occur on nearly level to steep slopes on landforms which include hillsides and ridges in the 10-14" precipitation zone. The soils of this site are moderately deep to very deep (greater than 20" to bedrock), well drained soils that formed in eolian deposits, alluvium or residuum derived from unspecified sandstone. These soils have rapid permeability. The main soil limitations include low available water holding capacity, and high wind erosion potential. The soil will develop into active sand dunes, with the deterioration of cover. The present plant community is a *Threadleaf sedge/Needleandthread/Yucca* plant community. Dominant vegetation includes needleandthread, threadleaf sedge, sand dropseed and yucca. Other vegetative species identified at onsite include prairie sandreed, Indian ricegrass, cheatgrass and prickly pear.

A summary of the ecological sites within the project area are listed in the table below along with the individual acreage and the percentage of the total area identified within the POD boundary.

Table 3.4 Summary of Ecological Sites

Ecological site	Acres	Percent
SHALLOW LOAMY (10-14NP)	12496.0	45%
LOAMY (10-14NP)	7638.6	27%
SANDY (10-14NP)	2911.1	10%
MISCELLANEOUS AREAS	2256.5	8%
SANDS (10-14NP)	1662.9	6%

3.3. Wildlife

Several resources were consulted to identify wildlife species that may occur in the proposed project area. Resources that were consulted include the wildlife database compiled and managed by the BLM Buffalo

Field Office (BFO) wildlife biologists, the PRB FEIS, the Wyoming Game and Fish Department (WGFD) big game and sage-grouse maps, and the Wyoming Natural Diversity Database (WYNDD).

A habitat assessment and wildlife inventory surveys were performed by Big Horn Environmental Consultants (BHEC) performed surveys for mountain plover, sharp-tailed grouse, greater sage-grouse, raptor nests, and prairie dog colonies according to Powder River Basin Interagency Working Group (PRBIWG) accepted protocol in 2009 and 2010. Surveys were conducted for Ute ladies'-tresses orchid and blowout penstemon. PRBIWG accepted protocol is available on the Wyoming Energy Resource Information Clearinghouse website (www.weric.info).

WGFD is the agency responsible for management of wildlife populations in the state of Wyoming. WGFD has developed several guidance documents that BLM BFO wildlife staff relies upon in evaluating impacts to wildlife and wildlife habitats. WGFD documents used to analyze the proposed project under the current analysis are referenced in this section.

In its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (WGFD 2009), WGFD developed impact thresholds to evaluate impacts to wildlife from oil and gas development. For species or habitats discussed in this EA where impact thresholds have been developed, those thresholds will be disclosed and discussed both in relation to the current conditions (Affected Environment) and in relation to reasonable foreseeable development, including development associated with the proposed project (Impacts Analysis). Moderate impacts occur when impairment of habitat function becomes discernable. High impacts occur when impairment of habitat function increases. Extreme impacts occur where habitat function is substantially impaired. Mitigation for each level of impact is discussed in the guidelines. Thresholds for impacts are generally determined by well densities.

3.3.1. Threatened, Endangered, Proposed, and Candidate Species

3.3.1.1. Threatened and Endangered Species

3.3.1.1.1. Black-footed ferret

The black-footed ferret is listed as Endangered under the ESA. The affected environment for black-footed ferrets is discussed in the PRB FEIS on pg. 3-175. The BLM data base and surveys by BHEC indicate prairie dog colonies within 0.25 miles of the Table Mountain 2 POD cover between 410 and 480 acres, well below the 1000 contiguous acres required to support a population of black-footed ferrets (USFWS 1989). The Table Mountain POD does not have suitable habitat for black-footed ferrets.

3.3.1.1.2. Blowout Penstemon

Blowout penstemon is listed as Endangered under the ESA. It is a regional endemic species with documented populations in the Sand Hills of west-central Nebraska and the northeastern Great Divide Basin of Carbon County, Wyoming. Suitable blowout penstemon habitat consists of sparsely vegetated, early successional, shifting sand dunes and blowout depressions created by wind. In Wyoming, the habitat is typically found on sandy aprons or the lower half of steep sandy slopes deposited at the base of granitic or sedimentary mountains or ridges. No suitable blowout penstemon habitat was found during surveys by BHEC in the Table Mountain 2 POD.

3.3.1.1.3. Ute Ladies'-Tresses Orchid

The Ute ladies'-tresses orchid (ULT) is listed as Threatened under the ESA. The affected environment for ULT is discussed in the PRB FEIS on pg. 3-175. Within the Table Mountain 2 POD, perennial sources are limited to Willow Creek and Craney Draw (BHEC 2010). These areas are characterized by heavy clay soils, high alkali deposition, with little emergent vegetation. Suitable habitat for Ute ladies' tresses orchid is not present in the project area.

3.3.1.2. Proposed Species

3.3.1.2.1. Mountain Plover

At the time the PRB FEIS was written, the mountain plover was proposed for listing as a threatened species under the ESA. USFWS withdrew the proposal in 2003 but reinstated it again in 2010. USFWS will submit a final listing determination in 2011. The mountain plover is also listed as a Wyoming BLM sensitive species and are a WGFD SGCN, with a rating of NSS4 (Wyoming populations declining or restricted in numbers or distribution, extirpation not imminent; habitat not restricted, vulnerable but no loss; species not sensitive to human disturbance) because population status and trends are unknown but are suspected to be stable, habitat is vulnerable without ongoing loss, and the species is sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. The affected environment for mountain plover is discussed in the PRB FEIS on pg. 3-177 to 3-178.

The sloping terrain and height of vegetation in the project area limits its suitability for mountain plover. No mountain plovers have been observed in the project during surveys by BHEC from 2006 to 2010.

3.3.1.3. Candidate Species

In 2010, USFWS determined that the sage-grouse is warranted for federal listing across its range, but listing is precluded by other higher priority listing actions. In addition to being listed as a Wyoming BLM sensitive species, sage-grouse are listed as a WGFD species of greatest conservation need, because populations are declining and they are experiencing ongoing habitat loss. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Sagebrush cover is present throughout the project area. Models developed by Doherty (2008, 2008b) indicate that 95 percent of the POD is in high quality seasonal habitat for sage-grouse, however, during onsite field visits the BLM wildlife biologist noted that sagebrush cover in the vicinity of the project is limited in vigor and density due to sandy soils on erodible terrain; and by livestock use. No sage-grouse or their sign were observed during field visits.

The State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (2008) recommends that impacts be considered for leks within four miles of oil and gas developments. WGFD records indicate that 14 sage-grouse leks occur within four miles of the project area. These 14 lek sites are identified in the following table.

Table 3.5 Sage-grouse leks within 4 miles of the Table Mountain 2 project area (all occupied)

Lek Name	Legal Location	Distance from Project Area (mi)	WGFD Category of Impact
Christensen Ranch 1	T44N, R76W S. 19	2.9 south	High
Christensen Ranch 2	T44N, R77W S. 24	2.2 south	High
Christensen Ranch 3	T44N, R77W S. 12	0.4 south	Extreme
Christensen Ranch 4	T45N, R76W S. 19	Within POD	Extreme
Christensen Ranch 5	T45N, R76W S. 32	0.5 southwest	Moderate
Christensen Ranch 7	T44N, R77W S. 11	0.3 south	Extreme
County Line	T46N, R76W S. 16	1.9 north	Extreme
Gilkie Ranch	T46N, R76W S. 1	3.9 north	Extreme
Innes	T46N, R75W S. 30	2.3 east	High
Irigaray	T45N, R77W S. 29	1.3 south	Extreme
Irigaray II	T45N, R77W S. 28	1.1 south	Extreme

Lek Name	Legal Location	Distance from Project Area (mi)	WGFD Category of Impact
Mengel	T44N, R77W S. 19	3.6 southwest	Extreme
North Butte	T44N, R75W S. 18	3.7 southeast	Extreme
Willow Creek	T45N, R76W S. 23	0.3 east	Extreme

In its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (2009), WGFD categorized impacts to sage-grouse by number of well pad locations per square mile within two miles of a lek and within identified nesting/brood-rearing habitats greater than two miles from a lek. Moderate impacts occur when well density is between one and two well pad locations per square mile or where there is less than 20 acres of disturbance per square mile. High impacts occur when well density is between two and three well pad locations per square mile or when there are between 20 and 60 acres of disturbance per square mile. Extreme impacts occur when well density exceeds three well pad locations per square mile or when there are greater than 60 acres of disturbance per square mile.

3.3.2. BLM Sensitive Species

Wyoming BLM has prepared a list of sensitive species on which management efforts should be focused towards maintaining habitats under a multiple use mandate. The goals of the policy are to:

- Maintain vulnerable species and habitat components in functional BLM ecosystems
- Ensure sensitive species are considered in land management decisions
- Prevent a need for species listing under the ESA
- Prioritize needed conservation work with an emphasis on habitat

The authority for the sensitive species policy and guidance comes from the Endangered Species Act of 1973, as amended; Title II of the Sikes Act, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; and the Department Manual 235.1.1A. BLM Wyoming sensitive species that will be impacted beyond the level analyzed within the PRB FEIS are described below.

3.3.2.1. Bald Eagle

The affected environment for bald eagles is described in the PRB FEIS on pg. 3-175. At the time the PRB FEIS was written, the bald eagle was listed as a threatened species under the ESA. Due to successful recovery efforts, it was removed from the ESA on 8 August 2007. The bald eagle remains under the protection of the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. In order to avoid violation of these laws and uphold the BLM's commitment to avoid any future listing of this species, the BLM shall continue to comply with all conservation measures and terms and conditions identified in the Powder River Basin Oil and Gas Project Biological Opinion (PRB Oil & Gas Project BO), #WY07F0075) (USFWS 2007) shall continue to be complied with.

In addition to being listed as a Wyoming BLM sensitive species, bald eagles are a WGFD SGCN with a NSS2 rating, due to populations being restricted in numbers and distribution, ongoing loss of habitat, and sensitivity to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region17.

Bald eagles have historically been observed along Willow Creek within the POD. No nest or winter roost concentration areas have been identified in the project area. Scattered cottonwood trees along Willow Creek provide roosting habitat for bald eagles. The western boundary of the Table Mountain 2 POD is approximately 1.5 miles from the Powder River and approximately 2.5 miles from bald eagle nest #

10343, the nearest bald eagle nest. Table 3.9 shows observations made by Big Horn Environmental Consultants during their 2009-2010 winter roost survey conducted on December 4, 16, and 30, 2009 and February 3, 2010. None of the observations are within the POD boundary.

Table 3.6 Winter 2009-10 bald eagle observations, TM 2 POD. (BHEC)

Date	Time	BAEA total	UTME	UTMN	Behavior	Description
30-Dec-09	0713	5	423233	4861159	Perched	AD BAEA (4) IMM BAEA (1), CTS
30-Dec-09	0746	2	408061	4860859	Perched	IMM BAEA (2), CTS
3-Feb-10	0735	5	422812	4861251	Perched	AD BAEA (5), CT
3-Feb-10	0739	1	422770	4865388	Perched	AD BAEA (1), CT
3-Feb-10	0739	4	422883	4866186	Perched	AD BAEA (4), CTS

3.3.2.2. Brewer's Sparrow

The affected environment for Brewer's sparrow is discussed in the PRB FEIS on pg. 3-200. In addition to being listed as a BLM Wyoming sensitive species, Brewer's sparrows are a WGFDF SGCN, with a rating of NSS4 because populations are declining, habitat is vulnerable with no ongoing loss, and the species is not sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17. Sparse to moderately dense sagebrush habitat occurs throughout project area and it is likely that Brewer's sparrows occur.

3.3.2.3. Ferruginous Hawk

The affected environment for ferruginous hawk is discussed in the PRB FEIS on pg. 3-183. In addition to being listed as a Wyoming BLM sensitive species, ferruginous hawks are a WGFDF SGCN, with a rating of NSS3 because the species is widely distributed, population status and trends are unknown but are suspected to be stable, they are experiencing ongoing loss of habitat, and they are sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17. Ferruginous hawk nesting has been documented in the project area and will be treated in the raptor section.

3.3.2.4. Western Burrowing Owl

The affected environment for western burrowing owl (burrowing owl) is discussed in the PRB FEIS on pg. 3-186. In addition to being listed as a Wyoming BLM sensitive species, burrowing owls are a WGFDF SGCN, with a rating of NSS4 because the species is widely distributed, population status and trends are unknown but are suspected to be stable, habitat is restricted or vulnerable without substantial recent or ongoing loss, and it may be sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action, and they are also a USFWS BCC in Region 17. Two burrowing owl nest sites have been documented in the project area in T45N, R77W SE Section 15.

3.3.2.5. Black-Tailed Prairie Dog

The affected environment for black-tailed prairie dogs is discussed in the PRB FEIS (pg 3-179). At the time the PRB FEIS was written, the black-tailed prairie dog was added to the list of candidate species for federal listing in 2000 (USFWS 2000). It was removed from the list in 2004. Wyoming BLM considers black-tailed prairie dogs a sensitive species and continues to afford this species the protections described

in the PRB FEIS. The black-tailed prairie dog is a WGFD SGCN, with a rating of NSS3, because populations are declining, and habitat is vulnerable but not undergoing significant loss.

The black-tailed prairie dog is considered common in Wyoming, although its abundance fluctuates with activity levels of Sylvatic plague and the extent of control efforts by landowners. Comparisons with 1994 aerial imagery indicated that black-tailed prairie dog acreage remained stable from 1994 through 2001, but aerial surveys conducted in 2003 indicated that approximately 47% of the prairie dog acreage was impacted by Sylvatic plague and/or control efforts (Grenier et al. 2004). Due to human-caused factors, black-tailed prairie dog populations are now highly fragmented and isolated (Miller et al. 1994). Most colonies are small and subject to potential extirpation due to inbreeding, population fluctuations, and other problems that affect long term population viability, such as landowner poisoning and disease (Primack 1993, Meffe and Carroll 1994, Noss and Cooperrider 1994).

Big Horn Environmental Consultants delineated 17 black-tailed prairie dog colonies scattered throughout the POD ranging in size from 1.5 to 161 acres and totaling 411 acres. Their sizes and locations area listed in the table below.

Black-tailed prairie dog colonies in the Table Mountain 2 project area

QQ	Section(s)	Twp N	Rng W	Size (in acres)
NESW	11	45	77	10.6
NESW	10	45	77	10
SENE	15	45	77	1.5
NESW	8	45	77	8
NWSW	33	46	77	22.4
SWSW	33	46	77	4.4
NENW	9	45	77	1.5
NWNE	9	45	77	2.5
NESW	14	45	77	8
NWNE	7	45	76	3.7
NENE	31	46	76	4.1
NESE	33	45	76	36
SWNE	10	45	76	20.3
NENW	4	44	76	35.5
SWSE	33	45	76	
SESE	33	45	76	22.5
SWNE	4	44	76	
SWSW	10	45	77	58.5
NENW	15	45	77	
SESE	15	45	77	161
SWSW	14	45	77	

3.3.2.6. Swift Fox

The affected environment for swift fox is discussed in the PRB FEIS on pg. 3-189. In addition to being listed as a BLM WY sensitive species, swift fox is also listed as a WGFD SGCN, with a rating of NSS4, because population status and trends are unknown but are suspected to be stable, and habitat is vulnerable

but is not undergoing substantial loss. Swift fox have been observed near the project area and are likely to occur.

3.3.3. Big Game

The affected environment for pronghorn and mule deer is discussed in the PRB FEIS on pp. 3-117 to 3-122 and pp. 3-127 to 3-132, respectively. Both mule deer and pronghorns were observed on a regular basis throughout the project area during the onsite visits. The POD includes big game range mapped by the Wyoming Game and Fish Department as yearlong and winter-yearlong range for mule deer and pronghorn. Yearlong use is when a population of animals makes general use of habitat within the range on a year-round basis. Winter-yearlong use occurs when animals make general use of habitat on a year-round basis, however, there is a significant influx of additional animals into the area from other seasonal ranges during the winter months. Populations of pronghorn and mule deer within their respective hunt areas are above WGFD objectives. The most current big game range maps are available from WGFD.

3.3.4. Aquatic Species

Aquatic habitats in the Table Mountain 2 POD area are limited to the perennial Willow Creek, isolated pools in Craney Draw, springs in T45N R76W NWNE Sec 8 and T45N R76W SENW Sec.17, and the Middle Water Spring in T45N, R76W SENW Sec.21. Small cyprinid fishes were observed by the BLM biologist and Natural Resource Specialist in Willow Creek during onsite visits. The Powder River Basin ecosystem and fishery is discussed in further detail in the PRB FEIS (pp. 3-153 to 3-166).

3.3.5. Migratory Birds

A wide variety of migratory birds may be found in the proposed project area at some point throughout the year. Migratory birds are those that migrate for the purpose of breeding and foraging at some point in the calendar year. Many species that are of high management concern use shrub-steppe and shortgrass prairie areas for their primary breeding habitats (Saab and Rich 1997). Species observed by the BLM biologist during the onsite visits included: Brewer's blackbird, lark sparrow, cliff swallow, American kestrel, common nighthawk, killdeer, golden eagle, mourning dove, horned lark, rock wren, lark bunting, and western meadowlark.

Other migratory birds with habitat present and considered likely to occur in the project area include; bald eagle, Brewer's sparrow, ferruginous hawk, and burrowing owl. These are treated in the sensitive species and raptor sections.

The affected environment for migratory birds is discussed in the PRB FEIS (pp. 3-150 to 3-153).

3.3.6. Raptors

The affected environment for raptors is discussed in the PRB FEIS on pp. 3-141 to 3-148. Seven species of raptor have been documented to have used nests within 0.5 miles of the project area: burrowing owl, ferruginous hawk, golden eagle, great-horned owl, kestrel, red-tailed hawk, and Swainson's hawk.

Golden eagles are listed as a BCC by USFWS for Bird Conservation Region BCR Region 17, which encompasses the project area. BCCs are those species that represent USFWS's highest conservation priorities, outside of those that are already listed under ESA. The goal of identifying BCCs is to prevent or remove the need for additional ESA bird listings by implementing proactive management and conservation actions. Golden eagles were also identified as a Level III species in the Wyoming Bird Conservation Plan. Ferruginous hawks and burrowing are classified as BLM sensitive species.

One hundred and thirty-nine raptor nest sites have been documented to occur within 0.5 miles of the project boundary. Of these nests, three red-tailed hawk nests were active in 2010. In 2009, ten red-tailed

hawk, two great-horned owl, two golden eagle, and one long-eared owl nest were active (BHEC 2009, 2010).

3.4. Water Resources

The project area is within the Upper Powder River drainage system. Elevations within the project area range from approximately 4700 to 5240 feet above sea level with rolling topography that is cut channels with steep valley slopes. The project area is primarily located in tributaries to Willow Creek and Pumpkin Creek on the east side of the Powder River. Craney Draw, a major tributary to Willow Creek, and several unnamed tributaries to Willow Creek and Pumpkin Creek drain the POD area. The floodplain or valley bottom of Willow Creek is well developed and measures up to 1,000 feet across. Larger tributaries may also have floodplains with well defined low flow channels, whereas smaller tributaries and headwaters range from incised gullies, to flat bottom valleys with poorly defined low flow channels to grassy swales.

The Wyoming Department of Environmental Quality (WDEQ) has assumed primacy from United States Environmental Protection Agency for maintaining the water quality in the waters of the state. The Wyoming State Engineer's Office (WSEO) has authority for regulating water rights issues and permitting impoundments for the containment of surface waters of the state. The Wyoming Oil and Gas Conservation Commission (WYOGCC) has authority for permitting and bonding off channel pits that are located over State and fee minerals.

3.4.1. Groundwater

The groundwater in this project area has historically been used for stock water or domestic purposes. A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 52 registered stock and domestic water wells within ½ mile of a federal CBNG producing well in the POD with depths ranging from 4 to 7,200 feet. For additional information on water, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment pages 3-1 through 3-36 (groundwater).

WDEQ water quality parameters for groundwater classifications (Chapter 8 – Quality Standards for Wyoming Groundwater) define the following general limits for Total Dissolved Solids (TDS): 500 mg/l TDS for Drinking Water (Class I), 2000 mg/l for Agricultural Use (Class II) and 5000 mg/l for Livestock Use (Class III). For additional water quality limits for groundwater, please refer to the WDEQ web site.

The ROD includes a Monitoring, Mitigation and Reporting Plan (MMRP). The objective of the plan is to monitor those elements of the analysis where there was limited information available during the preparation of the EIS. The MMRP called for the use of adaptive management where changes could be made based on monitoring data collected during implementation.

Specifically relative to groundwater, the plan identified the following (PRB FEIS ROD page E-4):

- The effects of infiltrated waters on the water quality of existing shallow groundwater aquifers are not well documented at this time;
- Potential impacts will be highly variable depending upon local geologic and hydrologic conditions;
- It may be necessary to conduct investigations at representative sites around the basin to quantify these impacts;
- Provide site specific guidance on the placement and design of CBM impoundments, and
- Shallow groundwater wells would be installed and monitored where necessary.

The production of CBNG necessitates the removal of some degree of the water saturation in the coal

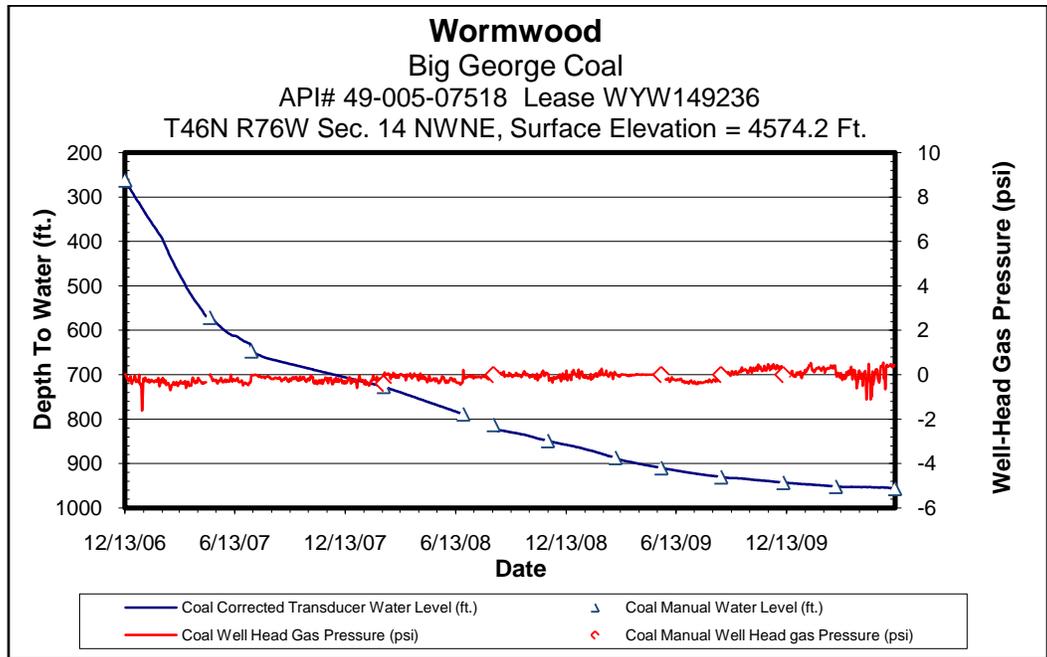
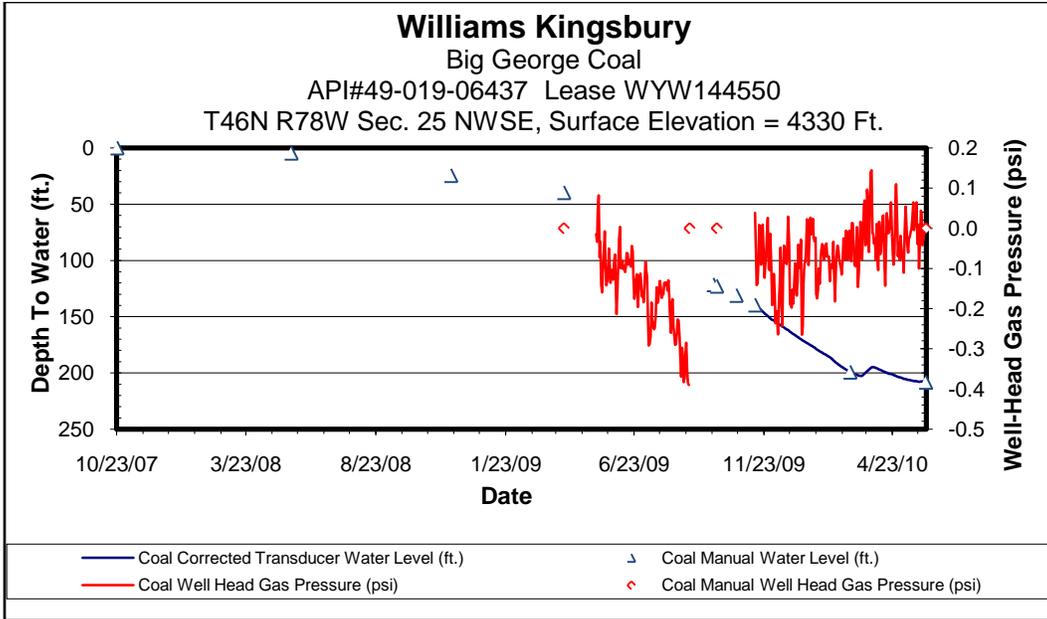
zones to temporarily reduce the hydraulic head in the coal. The Buffalo Field Office has been monitoring coal zone pressures as expressed in depth to water from surface since the early 1990s in the PRB (Figure 3.3).

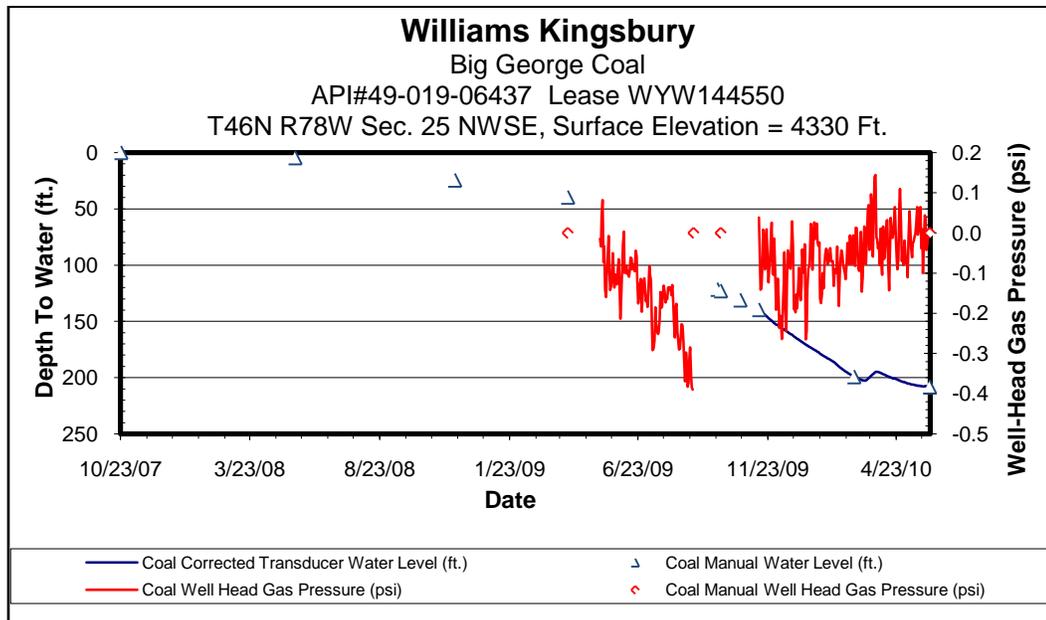
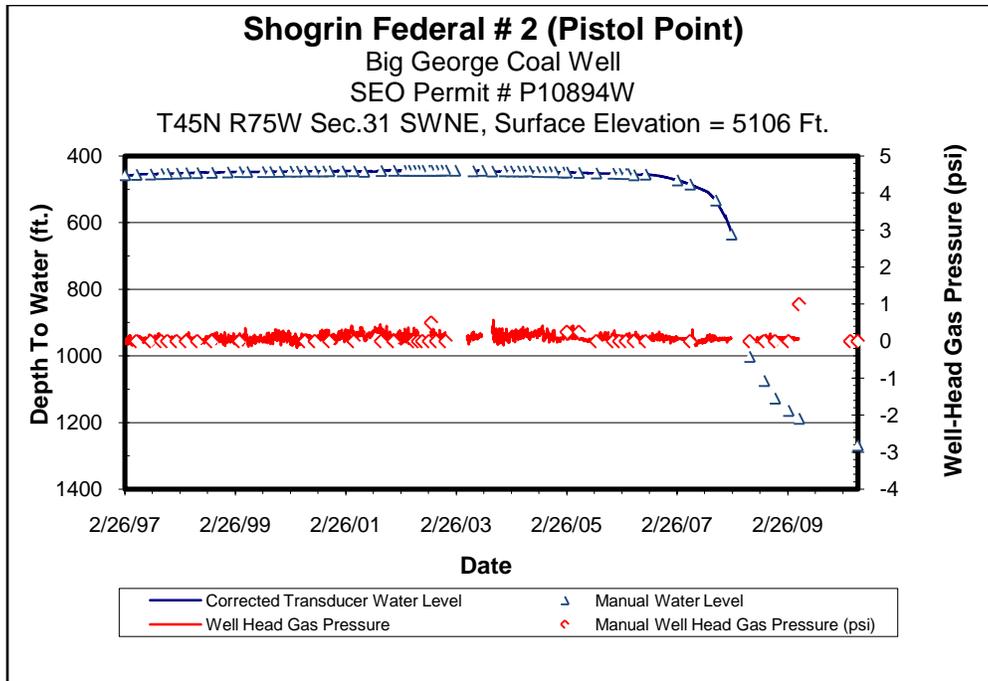
The areas to the north, east and within the TM2 POD have been intensely developed with CBNG production. As a result, the target coal zone pressure may have been reduced through off set water production. There are 3 BLM groundwater monitoring wells which are located within six miles of the TM2 POD boundary, as listed in the table below.

Monitor Well Name	QtrQtr	Sec	T N	R W	Distance from HUD POD, mi	Total Depth, ft	Initial WL, ft depth from surface	Most Recent WL, ft depth from surface	Drilled by	Date Installed
School Section Draw (Kingsbury U)	NWSE	25	46	78	2.6 NW	1505	0	208	Williams	10-23-07
Pumpkin Creek (Wormwood Unit)	NWNE	14	46	76	2.2 NE	1180	262	956	Williams	12-13-06
Shogrin Federal #2 (Pistol Point) – Big George	SWNE	31	45	75	1.5 SE	1559	456	1269		2-26-97

The initial water level of the Big George Coal was recorded between 0 and 456 feet below ground level prior to the majority of drilling and production in the area. In the most recent measurements, dated June, 2010, the water level ranged between 208 and 1269 feet below ground level.

This level of depressurization is within the potential predicted in the PRB FEIS which was determined through the Regional Groundwater Model for that document. For additional information, please refer to the PRB FEIS Chapter 4 Groundwater and the Wyoming State Geological Survey’s Open File Report 2009-10 titled “1993-2006 Coalbed Natural Gas (CBNG) Regional Groundwater Monitoring Report: Powder River Basin, Wyoming” which is available on their website at <http://www.wsgs.uwyo.edu>.





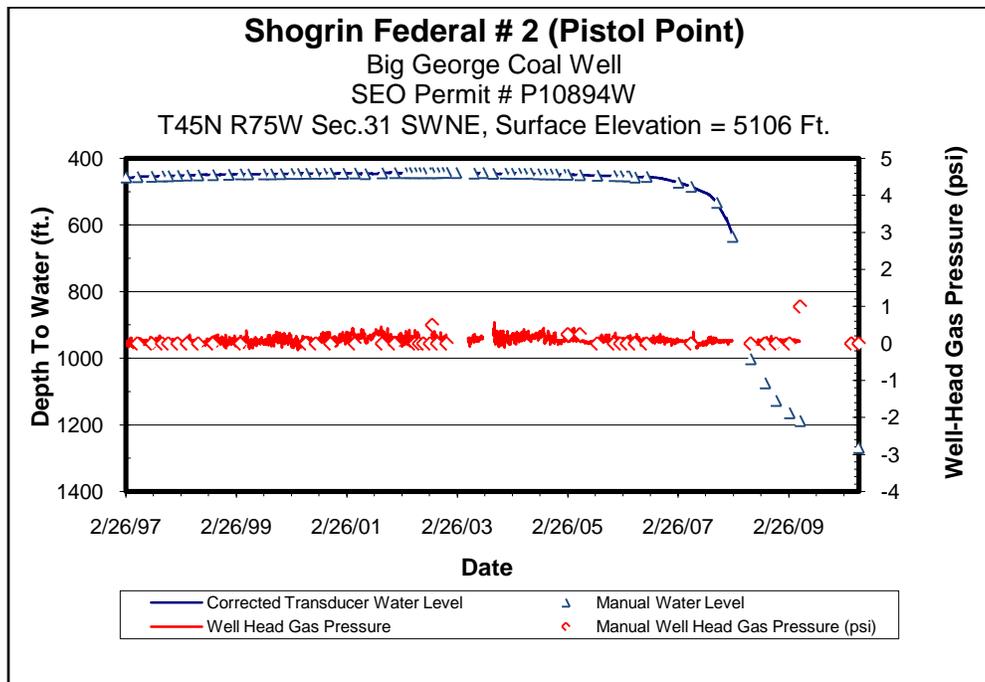
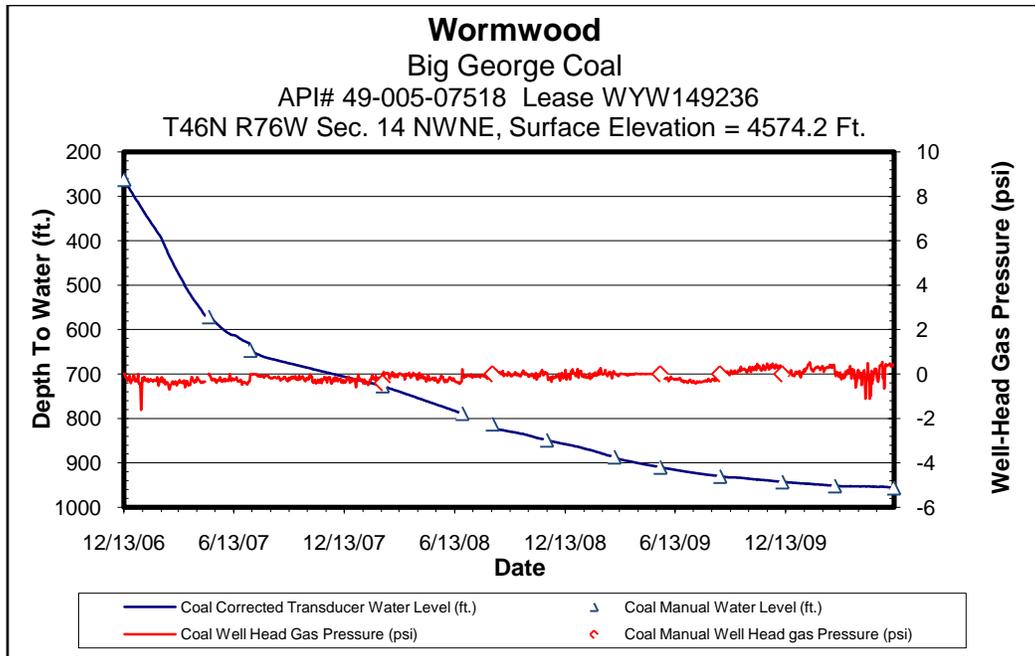


Figure 3.3 Depth to Water from Surface

3.4.2. Surface Water

The project area is primarily located in tributaries within the Willow Creek and Pumpkin Creek drainage which is tributary to the Upper Powder River watershed. Most of the drainages in the area are ephemeral (flowing only in response to a precipitation event or snow melt) to intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS Chapter 9 Glossary). The channels are primarily well vegetated grassy swales, without defined bed and bank.

The PRB FEIS presents the historic mean Electrical Conductivity (EC, in $\mu\text{mhos/cm}$) and Sodium Adsorption Ratio (SAR) by watershed at selected United States Geological Survey (USGS) Gauging Stations in Table 3-11 (PRB FEIS page 3-49). These water quality parameters “illustrate the variability in ambient EC and SAR in streams within the Project Area. The representative stream water quality is used in the impact analysis presented in Chapter 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of CBM produced water of varying chemical composition to surface drainages within the Project Area” (PRB FEIS page 3-48). For the Upper Powder River, the EC ranges 1,797 at Maximum monthly flow, to 3,400 at Low monthly flow and the SAR ranges from 4.76 at Maximum monthly flow to 7.83 at Low monthly flow. These values were determined at the USGS station located at Arvada, WY (PRB FEIS page 3-49).

The operator has identified three natural springs within one-mile of the TM2 POD boundary shown in the following table:

NAME	TWN	RNG	SEC	QQ	FLOW (GPM)	EC ($\mu\text{mhos/cm}$)	TDS (mg/l)	SAR
Craney Spring	45	76	8	NWNE	No Flow	No Flow	No Flow	No Flow
Thacker #1	45	76	17	SWNW	3.0	1,300	883	8.9
Middle Water Spring	45	76	21	SENE	0.88	2,570	2,210	4.3

For more information regarding surface water, please refer to the PRB FEIS Chapter 3 Affected Environment pages 3-36 through 3-56.

3.5. Economics and Recovery of CBNG Resources

Development of this project would have effects on the local, state, and national economies. Based on the estimates in the BLM’s 2009 Reasonably Foreseeable Development Scenario, the drilling of the 89 proposed wells in the Table Mountain Phase 2 Federal POD will generate approximately 0.23 billion cubic feet of gas (BCFG) per well, over the life of the well. Actual revenue from this amount of gas is difficult to calculate, as there are several variables contributing to the price of gas at any given time.

Regardless of the actual dollar amount, the royalties from the gas produced in the Table Mountain Phase 2 Federal POD would have several benefits. The federal government collects 12.5% of the royalties from all federal wells, which helps offset the costs of maintaining the federal agencies that oversee permitting. In addition to generating federal income, approximately 49% of the royalties from the Table Mountain Phase 2 Federal POD wells would return to the State of Wyoming. This revenue from mineral development contributes to Wyoming’s economy, and allows for improvements in state funded programs such as infrastructure and education. The development of the Table Mountain Phase 2 Federal POD project would also provide local revenue by employing workers in the area to build the roads and project infrastructure, drill the wells, and maintain and monitor the project area. This pool of individuals employed to work on the Table Mountain Phase 2 Federal POD project would also result in an increase in demand for goods and services from nearby communities, primarily those of NE, Wyoming.

3.6. Cultural Resources

A Class III cultural resource inventory was performed for the Table Mountain 2 POD prior to on-the-ground project work (BFO project no. 701000039). Arcadis U.S. Inc., conducted a block and linear class III cultural resource inventory following the Archeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines (48CFR190) and the Wyoming State Historic Preservation Office Format, Guidelines, and Standards for Class II and III Reports. Clint Crago, BLM Archaeologist, reviewed the report for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined it to be adequate. The results are summarized in Table 3.7.

Table 3.7 Cultural Resources Inventory Results

Site Number	Site Type	Eligibility
48CA268	Pumpkin Buttes TCP	Eligible
48CA470	Historic corral	Not Eligible
48CA471	Prehistoric Lithic Scatter	Not Eligible
48CA1480	Prehistoric Campsite	Eligible
48CA1496	Prehistoric Campsite	Eligible
48CA1543	Historic Foundation and Artifact Scatter	Not Eligible
48CA1567	Historic Homestead	Not Eligible
48CA3661	Prehistoric Campsite	Not Eligible
48CA4057	Prehistoric Lithic Scatter	Not Eligible
48CA6756	Historic Cairn	Not Eligible
48CA6757	Prehistoric Lithic Scatter	Not Eligible
48CA7008	Prehistoric Lithic Scatter	Eligible
48CA7009	Prehistoric Lithic Scatter	Unevaluated

The Pumpkin Buttes (48CA268) Traditional Cultural Property (TCP) is eligible for the National Register of Historic Places for its association with significant historical events, for its association significant historic individuals, for its ability to provide significant historic and prehistoric information, as a location associated with the traditional beliefs of numerous Native American groups about their cultural history, and as a location where Native American religious practitioners have historically gone to perform ceremonial activities in accordance with traditional cultural rules of practice. Although there is currently ongoing energy development in the vicinity, the setting of the site is considered to be intact and contributes to its eligibility. The Table Mountain 2 POD will not physically impact the TCP, but infrastructure is proposed within the viewshed and setting of the site in T45N R76W Sections 26, 27, 28, 33 and 34.

3.7. Air Quality

Existing air quality throughout most of the Powder River Basin is in attainment with all ambient air quality standards. Although specific air quality monitoring is not conducted throughout most of the Powder River Basin, air quality conditions in rural areas are likely to be very good, as characterized by limited air pollution emission sources (few industrial facilities and residential emissions in the relatively small communities and isolated ranches) and good atmospheric dispersion conditions, resulting in relatively low air pollutant concentrations.

Existing air pollutant emission sources within the region include following:

- Exhaust emissions (primarily CO and nitrogen oxides [NO_x]) from existing natural gas fired compressor engines used in production of natural gas and CBNG; and, gasoline and diesel vehicle tailpipe emissions of combustion pollutants;
- Dust (particulate matter) generated by vehicle travel on unpaved roads, windblown dust from neighboring areas and road sanding during the winter months;
- Transport of air pollutants from emission sources located outside the region;
- Dust (particulate matter) from coal mines;
- NO_x, particulate matter, and other emissions from diesel trains; and
- SO₂ and NO_x from power plants.

For a complete description of the existing air quality conditions in the Powder River Basin, please refer to the PRB Final EIS Volume 1, Chapter 3, pages 3-291 through 3-299.

4. ENVIRONMENTAL CONSEQUENCES

This section describes the environmental consequences of the proposed action, alternative B. The effects analysis addresses the direct and indirect effects of implementing the proposed action, the cumulative effects of the proposed action combined with reasonably foreseeable Federal and non-federal actions, identifies and analyzes mitigation measures (COAs), and discloses any residual effects remaining following mitigation.

4.1. Alternative A

The No Action Alternative was analyzed as Alternative 3 in the PRB FEIS, and is incorporated by reference into this EA. Information specific to resources for this alternative is included within the PRB Final EIS on pages listed in Table 4.1.

Table 4.1 Location of Discussion of the No Action Alternative in the PRB FEIS

Resource		Type of Effect	Page(s) of PRB FEIS	
Project Area Description	Geologic Features and Mineral Resources	Direct and Indirect Effects	4-164 and 4-134	
		Cumulative Effects	4-164 and 4-134	
Soils, Vegetation, and Ecological Sites	Soils	Direct and Indirect Effects	4-150	
		Cumulative Effects	4-152	
	Vegetation	Direct and Indirect Effects	4-163	
		Cumulative Effects	4-164	
	Wetlands/Riparian	Direct and Indirect Effects	4-178	
		Cumulative Effects	4-178	
Wildlife	Sensitive Species - Greater Sage-Grouse	Direct and Indirect Effects	4-271	
		Cumulative Effects	4-271	
	Aquatic Species	Direct and Indirect Effects	4-246	
		Cumulative Effects	4-249	
	Migratory Birds	Direct and Indirect Effects	4-234	
		Cumulative Effects	4-235	
	Waterfowl	Direct and Indirect Effects	4-230	
		Cumulative Effects	4-230	
	Big Game	Direct and Indirect Effects	4-186	
		Cumulative Effects	4-211	
	Raptors	Direct and Indirect Effects	4-224	
		Cumulative Effects	4-225	
	Water	Ground Water	Direct and Indirect Effects	4-63
			Cumulative Effects	4-69
Surface Water		Direct and Indirect Effects	4-77	
		Cumulative Effects	4-69	
Economics and Recovery of CBNG Resources	Direct and Indirect Effects	4-362		
	Cumulative Effects	4-370		
Cultural Resources	Direct and Indirect Effects	4-286		
Air Quality	Direct and Indirect Effects	4-386		
	Cumulative Effects	4-386		
Visual Resources	Direct and Indirect Effects	4-313		
	Cumulative Effects	4-314		

4.2. Alternative B

4.2.1. Land Use

4.2.1.1. Direct and Indirect Effects

Short-term direct effects would exist for land use within or adjacent to the project area due to construction activities, including land access due to the construction of access roads and wells pads, dust generation, and noise associated with heavy equipment operation. These effects would continue until reclamation of the areas temporarily used for construction of the wells.

Indirect effects include geologic hazards triggered by well development and CBNG production activities. Geologic hazards associated with CBNG production activity are discussed in the PRB FEIS. For details on geologic hazards, refer to the PRB FEIS.

4.2.1.1.1. Cumulative Effects

Because land use within the project area would only be affected on a short-term basis; cumulative effects are not anticipated.

4.2.1.1.2. Mitigation Measures

COAs, mitigation measures, and Operator Committed Measures discussed in **Appendix B** would avoid, minimize, and mitigate the impacts described above.

4.2.1.1.3. Residual Effects

Land use at the wells and along the roads and utility corridors would be converted either permanently or for the duration of the well operation to a mineral development use. During this timeframe, the proposed lands would no longer offer grazing potential. During the long term, a portion of the access corridors will ultimately reclaim providing forage.

4.2.1.2. Geologic Features and Mineral Resources

Only resources identified in Section 3.1 with potential for impact are addressed in this section; therefore, only activities associated with uranium are addressed here. The potential effects for all minerals associated with Alternative B, with the exception of uranium, are within the analysis parameters and impacts described in the PRB FEIS.

4.2.1.2.1. Direct and Indirect Effects

A potential effect to uranium deposits may include the modification of existing groundwater chemistry, which may result in the oxidation of uranium. Oxidation of uranium results in mobilization, which could lead to depletion of deposits prior to possible ISR activities. Any changes to groundwater chemistry would be dependent on the method of produced water disposal and the geochemistry of the recharged groundwater. Because produced water will not be reinjected within the project area, changes to groundwater chemistry as a result of water disposal are not anticipated.

An additional potential effect could be drawdown of the water table in uranium-rich zones due to pumping of groundwater from the aquifer. Because ISR involves the solubilization of uranium in the subsurface, extensive drawdown in aquifers that share hydraulic connections may inhibit the extraction of uranium deposits due to insufficient water volumes. Uranium deposits suitable for in-situ leaching (ISL) recovery within the POD are within the Wasatch formation, with relatively shallow aquifers confined by relatively impermeable stratigraphic units (COGEMA 2008). There are approximately 800 to over 1,000 feet of shale between the base of the Wasatch Formation and the targeted Big George coal seam in the project area. This is sufficient thickness to reasonably ensure that a restrictive shale layer occurs between the two recovery zones (COGEMA 2008). The possible direct and indirect effects associated with drawdown are discussed in further detail in Section 4.2.4.

Inhibition of aboveground access for subsurface uranium extraction also may be considered a potential effect of project construction activities. However, because the current method of uranium mining is ISR, limitations to aboveground access for uranium extraction are anticipated to be short-term.

4.2.1.2.2. Cumulative Effects

Direct or indirect impacts to in-situ uranium recovery are anticipated to be insignificant. Development of any future uranium extraction will be assessed and disclosed through permitting, and therefore, impacts to uranium recovery will continue to be addressed. Cumulative impacts on uranium recovery are not anticipated from the proposed project or alternatives.

4.2.1.2.3. Mitigation Measures

COAs, mitigation measures, and Operator Committed Measures discussed in **Appendix A** would avoid, minimize, and/or mitigate the impacts described above. Additional measures to minimize groundwater drawdown, uranium-bearing groundwater extraction, and changes to groundwater geochemistry due to water mixing include following drilling and well completion procedures in accordance with WOGCC and BLM guidelines. Implementation of Operator Committed Measures and programmatic mitigation measures identified in the PRB FEIS (Appendix B, Section B.3) would help avoid negative impacts to groundwater or mitigate impacts if they occurred. This would ensure isolation of groundwater from differing formations during drilling and completion activities. While artificial hydraulic connections could be created through CBNG well development, the potential would be avoided by proper well construction.

4.2.1.2.4. Residual Effects

A potential residual effect may include the depletion of groundwater within uranium-bearing units as a result of pumping drawdown. However, as described above, because CBNG and uranium-bearing zone aquifers are not hydraulically connected, residual effects are not anticipated.

4.2.2. Soils, Vegetation, and Ecological Sites

4.2.2.1. Soils

4.2.2.1.1. Direct and Indirect Effects

The impacts listed below, singly or in combination, would increase the potential for valuable soil loss due to increased water and wind erosion, invasive plant establishment, and increased sedimentation and salt loads to the watershed system.

The effects to soils resulting from well, access roads and pipeline construction include:

- Mixing of horizons – occurs where construction on roads, pipelines or other activities take place. Mixing may result in removal or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Soils which are more susceptible to wind and water erosion may be moved to the surface. Soil structure may be destroyed, which may impact infiltration rates. Less desirable inorganic compounds such as carbonates, salts or weathered materials may be relocated and have a negative impact on revegetation. This drastically disturbed site may change the ecological integrity of the site and the recommended seed mix.
- Loss of soil vegetation cover, biologic crusts, organic matter and productivity. With expedient reclamation, productivity and stability should be regained in the shortest time frame.
- Soil erosion would also affect soil health and productivity. Erosion rates are site specific and are dependent on soil, climate, topography and cover.
- Soil compaction – the collapse of soil pores results in decreased infiltration and increased erosion potential. Factors affecting compaction include soil texture, moisture, organic matter, clay content

and type, pressure exerted, and the number of passes by vehicle traffic or machinery. Compaction may be remediated by plowing or ripping.

- Modification of hill slope hydrology.
- An important component of soils in Wyoming’s semiarid rangelands, especially in the Wyoming big sagebrush cover type, are biological soil crusts, or cryptogamic soils that occupy ground area not covered with vascular plants. Biological soil crusts are predominantly composed of cyanobacteria, green and brown algae, mosses and lichens. They are important in maintaining soil stability, controlling erosion, fixing nitrogen, providing nutrients to vascular plants, increasing precipitation infiltration rates, and providing suitable seed beds (BLM 2003). They are adapted to growing in severe climates; however, they take many years to develop (20 to 100) and can be easily disturbed or destroyed by surface disturbances associated with construction activities.
- These impacts, singly or in combination, would increase the potential for valuable soil loss due to increased water and wind erosion, invasive/noxious/poisonous plant spread, invasion and establishment, and increased sedimentation and salt loads to the watershed system.

4.2.2.1.2. Highly Erosive Soils

Approximately 3,000 acres of the area within the Table Mountain Phase 2 POD boundary contains soil mapping units with a named soil component identified as being highly erosive due to wind or water erosion. Erosion rates are site specific and are dependent on soil, climate, topography and vegetative cover. Effects would be loss of soil vegetation cover, biologic crusts, organic matter and productivity. Soil compaction, the collapse of soil pores, results in decreased infiltration and increased erosion potential. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery.

In addition, soils which are more susceptible to wind and water erosion may be moved to the surface. Soils susceptible to erosion may be exposed to increased sedimentation. Effects would be erosion, increased gullies, and sedimentation. Soil erosion would also affect soil health and productivity. Impacts from erosion will be reduced by following the POD specific reclamation plan that was submitted by APC, and with use of BLM applied mitigation. For further detail for areas called out in the POD specific reclamation plan please refer to the table below.

	Site #	Well #	Site Type
1	TM2_1	4576 7-12	Road
2	TM2_10	4577 3-12	Pad
3	TM2_100	4676 27-23	Pad
4	TM2_101	4676 27-23	Road
5	TM2_102	4676 27-23	Road
6	TM2_105	4576 3-14	Road
7	TM2_106	4576 3-14	Road
8	TM2_108	4576 11-12	Pad
9	TM2_109	4576 3-34	Pad
10	TM2_11	4577 3-12	Road
11	TM2_110	4477 1-32	Pad
12	TM2_111	4477 1-32	Pad

	Site #	Well #	Site Type
13	TM2_112	4477 1-12	Pad
14	TM2_113	4477 2-12	Pad
15	TM2_114	4477 2-12	Road
16	TM2_115	4477 3-32	Pad
17	TM2_116	4577 9-34	Pad
18	TM2_117	4576 3-34	Road
19	TM2_12	4577 4-43	Pad
20	TM2_13	4577 9-14	Pad
21	TM2_14	4577 9-23	Road
22	TM2_15	4577 9-23	Road
23	TM2_16	4577 Sec 4, 9, 10, 15	Road
24	TM2_17	4577 Sec 4, 9, 10, 15	Road
25	TM2_18	4577 Sec 4, 9, 10, 15	Road
26	TM2_19	4577 Sec 4, 9, 10, 15	Road
27	TM2_2	4576 7-12	Pad
28	TM2_20	4577 Sec 4, 9, 10, 15	Road
29	TM2_200	4576 27-14	Road
30	TM2_201	4576 28-14	Pad
31	TM2_202	4576 28-14	Road
32	TM2_205	4576 22-14	Slot
33	TM2_206	4576 22-14	Road
34	TM2_207	4576 22-14	Road
35	TM2_21	4577 Sec 4, 9, 10, 15	Road
36	TM2_22	4577 Sec 4, 9, 10, 15	Road
37	TM2_23	4577 Sec 4, 9, 10, 15	Road
38	TM2_24	4577 4-23	Road
39	TM2_25	4577 4-23	Pad
40	TM2_26	4577 4-21	Road
41	TM2_27	4677 33-34	Road
42	TM2_28	4677 33-23	Pad
43	TM2_29	4677 33-14	Pad
44	TM2_3	4576 7-21	Slot
45	TM2_30	4577 4-12	Pad
46	TM2_300	4577 15-34	Pad
47	TM2_301	4577 10-34	Road
48	TM2_302	4577 10-43	Pad
49	TM2_303	4577 10-41	Road
50	TM2_304	4577 10-41	Road
51	TM2_305	4577 9-41	Slot
52	TM2_306	4576 27-32	Road

	Site #	Well #	Site Type
53	TM2_307	4576 28-32	Pad
54	TM2_308	4576 28-41	Road
55	TM2_309	4576 21-23	Pad
56	TM2_31	4677 34-14	Road
57	TM2_310	4576 22-12	Road
58	TM2_311	4577 3-14	Road
59	TM2_312	4577 10-12	Pad
60	TM2_313	4577 3-34	Pad
61	TM2_314	4577 3-32	Pad
62	TM2_315	4577 2-12	Pad
63	TM2_316	4677 34-32	Pad/Road
64	TM2_317	4677 34-41	Pad/Road
65	TM2_318	4576 18-21	Road
66	TM2_319	4576 6-14	Pad
67	TM2_32	4677 33-43	Pad
68	TM2_320	4577 2-12	Road
69	TM2_321	4577 2-12	Road
70	TM2_322	4576 3-32/3-41	Corridor
71	TM2_324	4577 3-32	Road
72	TM2_325	4577 3-32	Road
73	TM2_326	4577 3-32	Road
74	TM2_33	4677 33-43	Road
75	TM2_34	4677 33-43	Road
76	TM2_35	4677 34-12	Road
77	TM2_36	4677 34-12	Pad
78	TM2_37	4677 34-23	Pad
79	TM2_38	4677 34-21	Pad
80	TM2_4	4576 7-21	Road
81	TM2_5	4576 6-41	Pad
82	TM2_6	4576 6-23	Road
83	TM2_7	4576 6-21	Pad
84	TM2_8	4576 6-21	Road
85	TM2_9	4576 6-12	Road

4.2.2.1.3. Reclamation Suitability

Direct effects to vegetation would occur from ground disturbance caused by construction of roads, associated pipelines, and well locations. Effects are both short term and long term. Short term effects would occur where vegetated areas are disturbed but reclaimed within 1 to 3 years of the initial disturbance. Long-term effects would occur where road, well sites, water handling facilities, or other semi-permanent facilities would result in loss of vegetation and prevent reclamation for the life of the project.

Within the project area, 66% of the soils have poor reclamation suitability. These areas typically occur on the majority of ridge tops found throughout the POD. For further detail please refer to Table 3.2 Poor Reclamation Suitability within the Table Mountain Phase 2 Project Area. For a detailed summary of the disturbance for the operators proposed action please refer to SUDS form within the Table Mountain Phase 2 Federal POD.

4.2.2.1.4. Cumulative Effects

The designation of the duration of disturbance is defined in the PRB FEIS (pg 4-1 and 4-151). Most soil disturbances would be short term impacts with expedient interim reclamation and site stabilization, as committed to by the operator in their POD Surface Use Plan and as required by the BLM in COAs.

Geomorphic effects of roads and other surface disturbance range from chronic and long-term contributions of sediment into waters of the state to catastrophic effects associated with mass failures of road fill material during large storms. Roads can affect geomorphic processes primarily by: accelerating erosion from the road surface and prism itself through mass failures and surface erosion processes; directly affecting stream channel structure and geometry; altering surface flow paths, leading to diversion or extension of channels onto previously unchanneled portions of the landscape; and causing interactions among water, sediment, and debris at road-stream crossings. These impacts, singly or in combination, could increase the potential for valuable soil loss due to increased water and wind erosion, invasive/noxious/poisonous plant spread, invasion and establishment, and increased sedimentation and salt loads to the watershed system.

4.2.2.1.5. Mitigation Measures

- Impacts to soils and vegetation from surface disturbance will be reduced by following the BLM applied mitigation. Mitigation measures applied to Table Mountain Phase 2 POD include site stabilization within 30 days of the initiation of construction activities for proposed improved roads with “poor” reclamation suitability; minimizing disturbance widths for roads and pipeline corridors; and maintaining 20 feet vegetative buffers near drainages.
- The operator has prepared and committed to a Table Mountain Phase 2 Federal POD Reclamation Management Plan to lessen the impacts to vegetation and soils.
- The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231). The Wyoming Reclamation Policy applies to all surface disturbing activities. Authorizations for surface disturbing actions are based upon the assumptions that an area can and ultimately will be successfully reclaimed. BLM reclamation goals emphasize eventual ecosystem reconstruction, which means returning the land to a condition approximate to an approved “Reference Site” or NRCS Ecological Site Transition State. Final reclamation measures are used to achieve this goal. BLM reclamation goals also include the short-term goal of quickly stabilizing disturbed areas to protect both disturbed and adjacent undisturbed areas from unnecessary degradation. Interim reclamation measures are used to achieve this short-term goal.
- With expedient reclamation, productivity and stability should be regained in the shortest time frame.
- Soil compaction would be remediated by ripping.
- In addition to the Operator Committed Measures and procedures identified in the WMP, channel crossings by road and pipelines would be constructed perpendicular to the flow. Culverts would be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams would be crossed

perpendicular to flow, where possible, and all stream crossing structures would be designed to carry the 25-year discharge event or other capacities as directed by the BLM. Channel crossings by pipelines would be constructed so that the pipe is buried at least 4 feet below the channel bottom.

4.2.2.1.6. Residual Effects

Residual Effects were also identified in the PRB FEIS at page 4-408 such as the loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established.

Construction and operation of roads and drainage crossings could degrade surface drainages from erosion or by increased surface flow. Increased flows could cause downcutting and lateral bank migration in fluvial environments, resulting in increased channel capacity over time within surface drainages. Implementation of the Operator Committed Measures, along with procedures identified in the WMP and additional mitigation measures identified above, would reduce impacts to water resources to negligible levels.

4.2.2.2. Vegetation

4.2.2.2.1. General Vegetation

4.2.2.2.1.1. Direct and Indirect Effects

Direct and indirect effects to vegetation are discussed in the PRB FEIS (pages 4-153 to 4-164). Direct effects to vegetation would occur from ground disturbance caused by construction of well pads, compressor stations, ancillary facilities, associated pipelines, and roads. Short-term effects would occur where vegetated areas are disturbed but later reclaimed within 1 to 3 years of the initial disturbance. Long-term effects would occur where well pads, compressor stations, roads, water-handling facilities, or other semi-permanent facilities would result in loss of vegetation and prevent reclamation for the life of the project.

Indirect effects, as described in the PRB FEIS, would include the spread and/or establishment of noxious weeds, the alteration in surface water flows affecting vegetation communities, alteration in ecosystem biodiversity, and changes in wildlife habitat. Changes in surface flow would be mitigated by the transporting of the discharged produced CBNG water to Midwest, Wyoming, where it would be reinjected into the Madison aquifer.

Complete restoration of sagebrush shrubland after disturbance can often take decades. Studies of Wyoming big sagebrush post fire recovery intervals, indicated that post fire regeneration of this species can take 50 to 120 years to regenerate naturally (Cooper et al. 2007; Baker 2006). Wyoming big sagebrush took approximately 17 years to re-establish after chemical removal in Wyoming (Johnson 1969) and sagebrush species can take only 3 to 7 years to begin to spread in locations where seed drilling or transplant of seedlings occurred (Tirmenstein 1999).

4.2.2.2.1.2. Cumulative Effects

Cumulative effects to vegetation from oil and gas development are discussed in the PRB FEIS (pages 4-164 and 4-172). Most surface disturbances would be short-term impacts related to construction activities that would be reclaimed through interim reclamation and site stabilization, as committed to by the operator and as required by the BLM in COAs. The proposed project is planned in an area already heavily impacted by mineral development and oil and gas activities.

Cumulative effects from the discharged produced CBNG water from the Proposed Action would be avoided through transportation of the water via the Salt Creek Pipeline to Midwest, Wyoming, where it would be reinjected into the Madison aquifer.

4.2.2.2.1.3. Mitigation Measures

Impacts to vegetation from surface disturbance would be reduced through the implementation of the mitigation measures in Appendix A; the Table Mountain Phase 2 Federal POD and its associated plans including the Integrated Weed and Pest Management Plan, the POD-specific reclamation plan, the WMP, the sage-grouse best management practices (BMPs), and the MSUP.

Within the operator POD-specific reclamation plan there are three seed mixes proposed: Clayey/Loamy/Silty, Shallow Clayey/Loamy/Silty, and a Sandy seed mix. For further detail on the seed mixes please refer to page 11 of the Table Mountain Phase 2 POD Reclamation Plans for Well/Roads 8-31-2010.

In addition, the operator would follow the guidance provided in the Wyoming Policy on Reclamation (Instruction Memorandum WY-90-231). The Wyoming Reclamation Policy applies to all surface-disturbing activities. Authorizations for surface-disturbing actions are based upon the assumptions that an area can and ultimately would be successfully reclaimed. BLM reclamation goals emphasize eventual ecosystem reconstruction, which means returning the land to a condition approximate to an approved "Reference Site" or NRCS Ecological Site Transition State. Final reclamation measures are used to achieve this goal. BLM reclamation goals also include the short-term goal of quickly stabilizing disturbed areas to protect both disturbed and adjacent undisturbed areas from unnecessary degradation. Interim reclamation measures are used to achieve this short-term goal.

4.2.2.2.1.4. Residual Effects

Residual effects identified in the PRB FEIS on page 4-408 include the loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established.

4.2.2.2.2. Invasive Species

4.2.2.2.2.1. Direct and Indirect Effects

Surface disturbance associated with construction of proposed access roads, pipelines, water management infrastructure, and related facilities would present opportunities for weed invasion and spread.

4.2.2.2.2.2. Cumulative Effects

The activities related to the performance of the proposed project would create a favorable environment for the establishment and spread of noxious weeds/invasive plants such as salt cedar, Canada thistle, Scotch thistle, Buffalo bur, Wild Licorice, and perennial pepperweed.

4.2.2.2.2.3. Mitigation Measures

The BLM has mitigated for invasive species by doing the following:

- Moving well moves to more suitable and reclaimable locations.
- Design alterations.
- Minimizing the overall foot print by corridoring utilities and access roads.
- Successful reclamation through application of the operator's reclamation plans would discourage establishment of invasive species during operations

4.2.2.2.2.4. Residual Effects

Control efforts by the operator are limited to the surface disturbance associated the implementation of the project. Cheat grass and other invasive species that are present within non-physically disturbed areas of the project area are anticipated to continue to spread unless control efforts are expanded. Cheatgrass and to a lesser extent, Japanese brome (*B. japonicus*) are found in such high densities and numerous locations throughout NE Wyoming that a control program is not considered feasible at this time; these annual bromes would continue to be found within the project area.

4.2.2.3. Ecological Sites

4.2.2.3.1. Direct and Indirect Effects

Direct and indirect effects to ecological sites are discussed in the PRB FEIS (pages 4-153-4 to 4-164). As proposed, the project would potentially alter the disturbance regimes in the project area, especially the frequency of fire due to increased activity in the project area. Additional effects include the increase in noxious weeds and alterations in vegetation community diversity and cover.

The discharged produced water from the Proposed Action would be transported via the Salt Creek Pipeline to Midwest, Wyoming, where it would be reinjected into the Madison aquifer. This would avoid the direct and indirect impacts to ecological sites from discharged produced water in the project area.

4.2.2.3.2. Cumulative Effects

Cumulative effects to ecological sites are discussed in the PRB FEIS (pages 4-153 to 4-172). Cumulative effects to ecological sites include the further alteration of disturbance regimes from the increased activity, increase in noxious weeds, and alterations in vegetation community's diversity and cover.

4.2.2.3.3. Mitigation Measures

Impacts to vegetation from surface disturbance would be reduced through the implementation of the mitigation measures in **Appendix A**; the Table Mountain 2 Federal POD and its associated plans including the Integrated Weed and Pest Management Plan, the POD-specific reclamation plan, the WMP, the sage-grouse BMPs, and the MSUP.

4.2.2.3.4. Residual Effects

The alteration of biodiversity of ecological sites could result from changes in disturbance regimes, alterations in vegetation in reclaimed areas, and the spread and establishment of weed species.

4.2.3. Wildlife

Anadarko has proposed to equip wells from the project with pump jacks once water production levels are too low for submersible pumps. Pump jacks will add a level of movement and noise in the project area above the more traditional CBNG well configuration. The use of pump jacks on CBNG wells in the Powder River Basin is relatively new and was not analyzed in the Powder River Basin Oil & Gas Project EIS (pg. 2-24), the document that this EA is tiered to. It is not known what additional impacts this will have to wildlife.

4.2.3.1. Threatened, Endangered, Proposed, and Candidate Species

Summary of Threatened and Endangered Species Habitat and Project Effects

Common Name (scientific name)	Habitat	Project Effects	Rationale
<i>Endangered</i>			
Black-footed ferret	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NE	Prairie dog colonies not of sufficient size to support a ferret population.
Blowout penstemon (<i>Penstemon haydenii</i>)	Sparsely vegetated, shifting sand dunes	NE	No suitable habitat present.

Common Name (scientific name)	Habitat	Project Effects	Rationale
<i>Threatened</i>			
Ute ladies'-tresses orchid (<i>Spiranthes diluvialis</i>)	Riparian areas with permanent water	NE	No suitable habitat present.
<i>Proposed</i>			
Mountain plover	Short-grass prairie with slopes < 5%	NLJ	No plovers observed in 2006- 2010 surveys. Suitable habitat is fragmented and limited.
<i>Candidate</i>			
Greater Sage-grouse	Basin-prairie shrub, mountain- foothill shrub	MIIH	Sagebrush cover will be affected.
Project Effects LAA - Likely to adversely affect NE - No Effect NLAA - May Affect, not likely to adversely affect individuals or habitat. NLJ – Not likely to jeopardize the continued existence of the species MIIH – May impact individuals and health			

4.2.3.1.1. Threatened and Endangered Species

4.2.3.1.1.1. Black-Footed Ferret

4.2.3.1.1.1.1. Direct and Indirect Effects

The development of the Table Mountain Phase 2 POD will have “*no effect*” on black-footed ferrets.

4.2.3.1.1.2. Blowout Penstemon

4.2.3.1.1.2.1. Direct and Indirect Effects

The development of the Table Mountain Phase 2 POD will have “*no effect*” on blowout penstemon.

4.2.3.1.1.3. Ute Ladies’-Tresses Orchid

4.2.3.1.1.3.1. Direct and Indirect Effects

There are no known populations or presence of suitable habitat within the project area. The development of the Table Mountain Phase 2 POD will have “*no effect*” on Ute ladies’-tresses orchids.

4.2.3.1.2. Proposed Species

4.2.3.1.2.1. Mountain Plover

4.2.3.1.2.1.1. Direct and Indirect Effects

Due to the general lack of suitable habitat within the project area, development of the Table Mountain 2 POD will “not likely jeopardize” the continued existence of mountain plovers.

4.2.3.1.2.1.2. Cumulative Effects

The increase in traffic into the area from the project and from other coalbed methane activities may increase the possibility of vehicle collisions with individual mountain plovers that may utilize the project area. The cumulative impacts to mountain plovers are discussed in the PRB FEIS.

4.2.3.1.2.1.3. Mitigation Measures

No mitigation measures for mountain plovers are needed.

4.2.3.1.2.1.4. Residual Effects

There is potential for plovers to be impacted by project related traffic outside the project boundary. Also potential for impacts to mountain plovers not detected by surveys and not covered by raptor or sage grouse timing restrictions.

4.2.3.1.3. Candidate Species

4.2.3.1.3.1. Greater Sage-grouse

4.2.3.1.3.1.1. Direct and Indirect Effects

Impacts to sage-grouse associated with energy development are discussed in detail in the *12-Month Findings for Petitions to List the Greater Sage-Grouse (Centrocercus urophasianus) as Threatened or Endangered* (USFWS 2010). Impacts to sage-grouse are generally a result of loss and fragmentation of sagebrush habitats associated with roads and infrastructure. Research indicates that sage-grouse hens also avoid nesting in developed areas. Alternative B of the Table Mountain 2 will introduce 89 CBM well locations and approximately 53 miles of road and utilities to the area. This will disturb approximately 345 acres of surface in sage brush steppe ecotype.

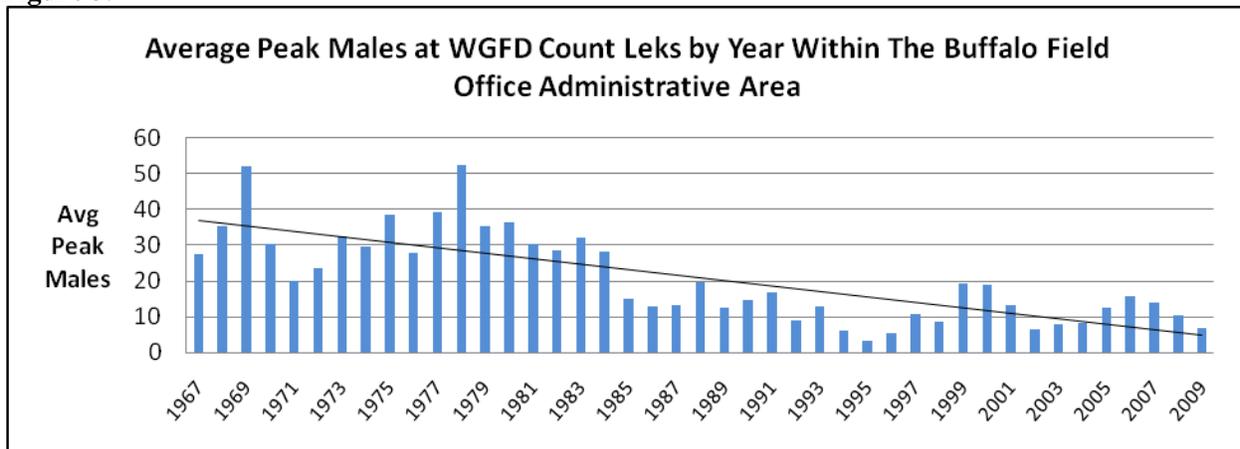
In addition, vehicle traffic and human presence in the area will be incrementally increased above the current level from existing development. Because much of the area impacted by the project facilities is within sparse sage cover with an apparent lack of use by grouse, the impacts to sage-grouse will be limited. The exception is in T45N, R76W Section 19 where an existing road will be used which travels to within 0.19 miles of the Christensen Ranch 4 lek. The road is shielded by a ridge and travel during breeding season will be restricted, but the end result will be an increase in traffic through this area. Sage-grouse travelling to and from the lek will be subject to an increase risk of collision with vehicles. Excessive noise or disturbance from traffic along the section of road in Section 19 would disrupt “lekking activities”.

4.2.3.1.3.1.2. Cumulative Effects

Recent research suggests that the cumulative and synergistic effects of current and foreseeable CBNG development within the vicinity of the project area are likely to impact the local sage-grouse population, cause declines in lek attendance, and may result in local extirpation. The cumulative impact assessment area for this project encompasses the project area and the area that is encompassed by a four mile radius around the four sage-grouse leks that occur within four miles of the project boundary. Analysis of impacts up to four miles was recommended by the State Wildlife Agencies’ Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (2008).

The sage-grouse population within northeast Wyoming has been exhibiting a steady long term downward trend, as measured by lek attendance (WGFD 2008b). Figure 3 illustrates a ten-year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak. Research suggests that these declines may be a result, in part, of CBNG development, as discussed in detail in USFWS (2010).

Figure 3.



Excluding the 89 project wells, there are approximately 901 proposed wells (Automated Fluid Minerals Support System [AFMSS] 8/2/10) within the cumulative effects analysis area. With the addition of these wells, well density would increase to 8.9 wells per square mile, well above the one well per square mile recommendation by the State Wildlife Agencies' Ad Hoc Committee for Sage-Grouse and Oil and Gas Development. In addition to the CBM development, there is existing and proposed uranium development. With approval of Alternative B (89 proposed well locations) well density would increase to 9.2 wells per square mile. With the approval of Alternative B, the Christensen Ranch 5 lek would change status, exceeding the WGFD threshold category for extreme impacts.

The PRB FEIS (BLM 2003) states that “the synergistic effect of several impacts would likely result in a downward trend for the sage-grouse population, and may contribute to the array of cumulative effects that may lead to its federal listing. Local populations may be extirpated in areas of concentrated development, but viability across the Project Area (Powder River Basin) or the entire range of the species is not likely to be compromised (pg. 4-270).” Based on the impacts described in the Powder River Basin Oil and Gas Project FEIS and the findings of more recent research, the proposed action may contribute to a decline in male attendance at the 14 leks that occur within four miles of the project area, and, potentially, extirpation of the local grouse population.

4.2.3.1.3.1.3. Mitigation Measures

In an attempt to reduce disturbance to breeding sage-grouse, timing limitations will be placed on 20 wells and associated infrastructure which will restrict surface disturbance during breeding season (March 15 – June 30). The road in T45N, R76W Section 19 which travels within 0.19 miles from the Christensen Ranch 4 lek will have CBNG traffic restricted during sage-grouse breeding season to non lek activity hours 9 am-3 pm with no stopping or getting out of vehicles.

4.2.3.1.3.1.1. Residual Effects

Timing restrictions placed on CBNG surface disturbing activities during sage-grouse breeding season in the Powder River Basin have not been effective in reducing decline in lek attendance. Timing restrictions have been applied to construction phase activities only. Once wells are in place, operation and maintenance is needed throughout the year which brings people and machinery into sage-grouse breeding areas. It is likely that the increase in traffic and activity in the area will contribute to the decline of sage-grouse in the project area.

4.2.3.2. BLM-Sensitive Species

BLM will take necessary actions to meet the policies set forth in sensitive species policy (BLM Manual 6840). BLM Manual 6840.22A states that “The BLM should obtain and use the best available information deemed necessary to evaluate the status of special status species in areas affected by land use plans or other proposed actions and to develop sound conservation practices. Implementation-level planning should consider all site-specific methods and procedures which are needed to bring the species and their habitats to the condition under which the provisions of the ESA are not necessary, current listings under special status species categories are no longer necessary, and future listings under special status species categories would not be necessary.”

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-265.

4.2.3.3.2. Bald Eagle

4.2.3.3.2.1. Direct and Indirect Effects

No identified nest or winter roost sites will be impacted by activities associated with the Table Mountain Phase 2 project. The construction and use of the proposed resource corridor adjacent to Willow Creek will introduce disturbance to bald eagles that use the cottonwoods stands as incidental roost sites.

4.2.3.3.2.2. Cumulative Effects

The cumulative effects for bald eagles associated with Alternative B are described in the PRB FEIS (pp. 4-251 to 4-253).

4.2.3.3.2.3. Mitigation Measures

No further mitigation measures will be applied.

4.2.3.3.2.4. Residual Effects

There will be increased traffic in the general area resulting from this project which may increase disturbance to foraging bald eagles in the Table Mountain 2 POD area.

4.2.3.3.3. Brewer’s Sparrow

4.2.3.3.3.1. Direct and Indirect Effects

Approximately 325 acres of surface will be disturbed during the development of this project. Much of this will be in sagebrush cover that serves as habitat for Brewer’s sparrows. Sagebrush cover in the POD area is sparse to moderate density because of sandstone outcropping and sandy soils which reduces its value as habitat to Brewer’s sparrows.

4.2.3.3.3.2. Cumulative Effects

PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273.

4.2.3.3.3.3. Mitigation Measures

No additional mitigation beyond the seasonal restrictions for sage-grouse and raptor nests.

4.2.3.3.3.4. Residual Effects

Aside from the direct loss of sagebrush cover, Brewer’s sparrows may nest in areas not covered by seasonal nesting protections for other species. These sparrows would be subject to disturbance and possible loss of nests during construction activities.

4.2.3.3.4. Ferruginous Hawk

Impacts to ferruginous hawks will be treated in the raptor section.

4.2.3.3.5. Western Burrowing Owl

4.2.3.3.5.1. Direct and Indirect Effects

The documented burrowing owl nest in the project area is near an existing major road which will receive an increase in traffic with the implementation of the proposed project. There is an increase in the possibility of collision with vehicles.

4.2.3.3.5.2. Cumulative Effects

The cumulative effects associated with Alternatives B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, pg. 4-221.

4.2.3.3.5.3. Mitigation Measures

The Thunder Basin National Grasslands in Campbell County, WY, who cooperated with the BLM in the creation of the 2003 PRB EIS, recommends a 0.25 mile timing restriction buffer zone for burrowing nest locations during their nesting season (April 15 to August 31). Instruction Memorandum No. 2006-197, directs the field offices to “use the least restrictive stipulations that effectively accomplish the resource objectives or uses.” Alteration of the general raptor nest timing limitation (Feb 1 to July 31) to a more specific burrowing owl nesting season timing limitation will effectively reduce the vulnerability of owls to collision while shortening the timing restriction period to four and one half months (See Chapter 3 for breeding, nesting, and migration chronology) from six and one half months and from 0.5 mile to 0.25 mile.

4.2.3.3.5.4. Residual Effects

No further effects identified.

4.2.3.3.6. Black-tailed Prairie Dog

4.2.3.3.6.1. Direct and Indirect Effects

Impacts to black-tailed prairie dogs are discussed in the PRB FEIS on pg. 4-255 to 4-256. Well 15-43 was originally located in a prairie dog town in NESE of Section 15 T45N, R77W. The well was moved because of raptor nest issues, south to a location outside the prairie dog colony reducing impacts to the colony.

4.2.3.3.6.2. Cumulative Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273.

4.2.3.3.6.3. Mitigation Measures

No further mitigation measure applied.

4.2.3.3.6.4. Residual Effects

No further effects identified.

4.2.3.3.7. Swift Fox

4.2.3.3.7.1. Direct and Indirect Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273. Increased traffic will increase the risk of swift fox mortality from vehicle collision.

4.2.3.3.7.2. Cumulative Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273.

4.2.3.3.7.3. Mitigation Measures

No further mitigation measure applied.

4.2.3.3.7.4. Residual Effects

No further effects identified.

4.2.3.4. Big Game

4.2.3.4.1. Direct and Indirect Effects

Alternative B of the Table Mountain 2 project will disturb approximately 325 acres of terrestrial habitat. It will involve approximately 42 miles of new road into areas with no previous access. This will cause an increase in disturbance, displacement, habitat fragmentation, exposure to hunting and possible vehicle collisions. There will be a slight decrease in available forage. Declines in big game populations are expected. Impacts to big game animals from CBNG development is discussed further in the PRB FEIS on pp.4-181 to 4-215.

4.2.3.4.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, pg. 4-181 to 4-215.

4.2.3.4.3. Mitigation Measures

No further mitigation measure applied.

4.2.3.4.4. Residual Impacts

No further effects identified.

4.2.3.5. Aquatic Species

4.2.3.5.1. Direct and Indirect Effects

The access/utility crossings and subsequent travel will cause an increase in turbidity and downstream sedimentation impacting habitat for aquatic species present in Willow Creek.

4.2.3.5.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, (pp. 4-247 to 4-249).

4.2.3.5.3. Mitigation Measures

No further mitigation measure applied.

4.2.3.5.4. Residual Impacts

No further effects identified.

4.2.3.6. Migratory Birds

4.2.3.6.1. Direct and Indirect Effects

Direct and indirect effects to migratory birds are discussed in the PRB FEIS (pp. 4-231 to 4-235). Disturbance of habitat within the project area is likely to impact migratory birds. Native habitats will be lost directly with the construction of wells, roads, and pipelines. Reclamation and other activities that occur in the spring may be detrimental to migratory bird survival. Prompt re-vegetation of short-term disturbance areas should reduce habitat loss impacts. Activities will likely displace migratory birds farther than the immediate area of physical disturbance. Drilling and construction noise can be troublesome for songbirds by interfering with the males' ability to attract mates and defend territory, and the ability to recognize calls from conspecifics (BLM 2003).

Habitat fragmentation will result in more than just a quantitative loss in the total area of habitat available;

the remaining habitat area will also be qualitatively altered (Temple and Wilcox 1986). Ingelfinger (2004) identified that the density of breeding Brewer's sparrows declined by 36% and breeding sage sparrows declined by 57% within 100 m of dirt roads within a natural gas field. Effects occurred along roads with light traffic volume (<12 vehicles per day). The increasing density of roads constructed in developing natural gas fields exacerbated the problem creating substantial areas of impact where indirect habitat losses through displacement were much greater than the direct physical habitat losses.

Those species that are edge-sensitive will be displaced further away from vegetative edges due to increased human activity, causing otherwise suitable habitat to be abandoned. If the interior habitat is at carrying capacity, then birds displaced from the edges will have no place to relocate. One consequence of habitat fragmentation is a geometric increase in the proportion of the remaining habitat that is near edges (Temple 1986). In severely fragmented habitats, all of the remaining habitat may be so close to edges that no interior habitat remains (Temple and Cary 1988). Over time, this leads to a loss of interior habitat species in favor of edge habitat species. Other migratory bird species that utilize the disturbed areas for nesting may be disrupted by the human activity, and nests may be destroyed by equipment.

4.2.3.6.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, pg. 4-235. No additional mitigation measures are required.

4.2.3.6.3. Mitigation Measures

Migratory bird species within the Powder River Basin nest in the spring and early summer and are vulnerable to the same effects as sage-grouse and raptor species. Though no timing restrictions are typically applied specifically to protect migratory bird breeding or nesting, where sage-grouse or raptor nesting timing limitations are applied, nesting migratory birds are also protected. Where these timing limitations are not applied and migratory bird species are nesting, migratory birds remain vulnerable.

4.2.3.6.4. Residual Effects

Those species and individuals that are still nesting when the sage-grouse timing limitations are over (June 30) may have nests destroyed, or be disturbed, by construction activities. Sage-grouse timing limitations will apply to the entire project. Protections around active raptor nests (Feb 1- July 31) extend past most migratory bird nesting seasons. Only a percentage of known nests are active any given year, so the protections for migratory birds from June 30-July 31 will depend on how many raptor nests are active.

4.2.3.7. Raptors

4.2.3.7.1. Direct and Indirect Effects

Human activities in close proximity to active raptor nests may interfere with nest productivity. Romin and Muck (1999) indicate that activities within 0.5 miles of a nest are prone to cause adverse impacts to nesting raptors. If mineral activities occur during nesting, they could be sufficient to cause adult birds to remain away from the nest and their chicks for the duration of the activities. This absence can lead to overheating or chilling of eggs or chicks and can result in egg or chick mortality. Prolonged disturbance can also lead to the abandonment of the nest by the adults. Routine human activities near these nests can also draw increased predator activity to the area and resulting in increased nest predation.

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a 0.5 mile radius timing limitation during the breeding season around active raptor nests and recommends all infrastructure requiring human visitation be located in such a way as to provide an adequate biologic buffer for nesting raptors. A biologic buffer is a combination of distance and visual screening that provides nesting raptors with security such that they will not be flushed by routine activities. Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (pp. 4-216 to 4-221).

Golden eagles are sensitive to human activity around nest sites and are threatened by loss of nesting habitat to industrial development, powerline executions, and other factors (Nicholoff 2003). The WGF D Wyoming Bird Conservation Plan habitat objectives for golden eagles include maintaining open country to provide habitat for small mammals as a food source.

Nest 3981 was active in years 2005 through 2009. There is a lot of existing disturbance in the area from CBNG and conventional oil well field development. The nest was not active in 2010 but a golden eagle pair was seen hunting in the area during several days of the onsite visits. It appears that the pair using this nest site has adapted to the activity in the area. A major road with a considerable amount of large truck traffic runs within 250 feet of the nest tree and an existing CBNG well is approximately 530 feet from the nest. Proposed well 15-32 is collocated on a pad with an existing conventional oil well approximately 0.47 miles from the nest. It is unlikely that this well will impact the eagle using the 3981 nest. Well 15-43 was moved to a location outside of the 0.5 mile buffer for the 3981 nest as well as the 0.25 mile buffer for the 5672 and 6331 burrowing owl nests which is consistent with U.S. Fish & Wildlife Service recommendations. The new proposed location for the 15-43 well will not impact the eagle nest or the two burrowing owl nests.

Golden eagle nest 3993 is in a cottonwood tree in a ravine out of line of sight of proposed wells 27-14, 27-23, 27-32, and 28-32. The nest was last active in 2006. Eagles nested at another site (3932) approximately 80 meters from nest 3993 in 2007. That site is now gone. Wells 27-32 and 28-32 are approximately 0.5 mile from and should not impact the nest. The access corridor to be used for the 28-32 well is an existing route that is in line of sight of the nest at one point. Well 27-23 is approximately 0.26 miles from the nest and is behind a hill. Well 27-14 is approximately 0.31 from the eagle nest. There are three existing wells within the 0.5 miles. With the addition of the new wells to the existing disturbance in the area, raptors may not return to use the nest sites. The placement of this well was reviewed by the U.S. Fish & Wildlife Service for compliance with the Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA) The BGEPA gives BLM a non-discretionary statutory requirement to protect bald and golden eagle nests. They recommended that because of the existing level of development within 0.5 miles of the nest, the 27-14 and 27-23 wells and their access should be moved out of the 0.5 mile buffer and seasonal timing limitations of January 15-July 31 should be applied. Despite seasonal timing limitations, well visitation will likely be necessary for operation and maintenance once the well is in place. Because the addition of the two wells may cross a disturbance threshold causing golden eagles to abandon the nest sit, it is recommended that the 27-14 and 27-23 wells be removed from the project.

Well 3-34 was moved from its original proposed location approximately 0.08 miles from raptor nests 8086, 8385, and 10610 to a location further to the south, approximately 0.19 miles and out of line of sight from the nest tree. There is one tree present at the site. The nests were reported as inactive in 2010 but there was one report of red-tailed activity and one report of Swainson's hawk activity in 2009. In addition, the access route to the well was routed from the south to reduce disturbance to the nest area that would have occurred with the original access route. A utility corridor will still be located near the nest area but will not be constructed during nesting season. Occasional maintenance will be required once the utility corridor becomes operational which could cause disturbance to raptors using the nest.

Well 21-12 is proposed approximately 0.11 miles from nest 5880. The nest has been actively used by red-tailed hawks in 2008, 2009, and 2010. The BLM biologist considered recommending moving the well but a move would have either caused more disturbance to sagebrush habitat or would have been out of the lease boundary. Despite seasonal timing limitations, well visitation will likely be necessary for operation and maintenance once the well is in place. The operation of a CBNG well at this location could preclude the use of the nest site by raptors in the future. The placement of this well was reviewed by the U.S. Fish

& Wildlife Service for compliance with the Migratory Bird Treaty Act. They recommended that the well be moved to a distance at least 0.25 miles from the nest and that seasonal restrictions be applied from February 1 – August 15. It is recommended that the 21-12 well be removed from the project. Wells 14-14, 33-14, 33-23, were moved to get them out of line of sight of raptor nest locations. The nests were unidentified raptor nests that have not been reported as active. The new well locations should not preclude future use of these nest sites by raptors. Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (pp. 4-216 to 4-221).

4.2.3.7.2. Cumulative Effects

The cumulative effects associated with Alternatives B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, pg. 4-221.

4.2.3.7.3. Mitigation Measures

Fifty-eight nests are within 0.5 miles of wells and infrastructure proposed for construction under the Table Mountain 2 POD. Forty-nine wells along with associated infrastructure will have timing limitations. Five wells were moved during the onsite to reduce disturbances to nearby raptor nests.

4.2.3.7.4. Residual Impacts

Timing limitations during the nesting season protect nesting raptors from disturbance during the construction phase, but once wells are in place operation and maintenance activities are required regardless of the time of year. Even though wells were moved to reduce disturbance to nests, the increase in noise, structures, and human presence may decrease the desirability of some raptors to return to use nests sites.

4.2.4. Water Resources

The operator has submitted a comprehensive WMP for this project. It is incorporated-by-reference into this EA pursuant to 40 CFR 1502.21. The WMP incorporates sound water management practices, monitoring of downstream impacts within the Upper Powder River watershed and commitment to comply with Wyoming State water laws/regulations. It also addresses potential impacts to the environment and Landowner concerns. Qualified hydrologists, in consultation with the BLM, developed the water management plan. Adherence with the plan, in addition to BLM applied mitigation (in the form of COAs), would reduce project area and downstream impacts from proposed water management strategies.

The operator proposes to inject 100% of the produced water from this project into the Madison aquifer located near Midwest, Wyoming.

The maximum water production is predicted to be 20 gpm per well or 1,780 gpm (3.96 cubic feet per second (cfs) or 2,871.1 acre-feet per year) for this POD. The PRB FEIS projected the total amount of water that was anticipated to be produced from CBNG development per year (Table 2-8 Projected Amount of Water Produced from CBM Wells Under Alternatives 1, 2A and 2B pg 2-26). For the Upper Powder River drainage, the projected volume produced within the watershed area was 60,319 acre-feet in 2010 (maximum production is estimated in 2006 at 171,423 acre-feet). As such, the volume of water resulting from the production of these wells is 4.8% of the total volume projected for 2010. This volume of produced water is within the predicted parameters of the PRB FEIS.

4.2.4.1. Groundwater

4.2.4.1.1. Direct and Indirect Effects

The PRB FEIS predicted that only 5% of the CBNG produced water would be injected into disposal wells in the Upper Powder River watershed (PRB FEIS pg 2-46). For this action, it may be assumed that a maximum of 1,780 gpm (2,871.1 acre-feet per year) will be reinjected into the Madison aquifer.

The PRB FEIS predicts that one of the environmental consequences of coal bed natural gas production is possible impacts to the groundwater. “The effects of development of CBM on groundwater resources would be seen as a drop in the water level (drawdown) in nearby wells completed in the developed coal aquifers and underlying or overlying sand aquifers.” (PRB FEIS page 4-1). In the process of dewatering the coal zone to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. The permitted water wells produce from depths which range from 4 to 7,200 feet compared to 1,100 to 1,850 feet to the Big George coal. The operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells.

Recovery of the coal bed aquifer was predicted in the PRB FEIS to “...resaturate and repressurize the areas that were partially depressurized during operations. The amount of groundwater stored within the Wasatch - Tongue River sand and coals, and sands units above and below the coals is almost 750 million acre-feet of recoverable groundwater are (PRB FEIS Table 3-5). Redistribution is projected to result in a rapid initial recovery of water levels in the coal. The model projects that this initial recovery period would occur over 25 years.” (PRB FEIS page 4-38).

4.2.4.1.2. Cumulative Effects

As stated in the PRB FEIS, “The aerial extent and magnitude of drawdown effects on coal zone aquifers and overlying and underlying sand units in the Wasatch Formation also would be limited by the discontinuous nature of the different coal zones within the Fort Union Formation and sandstone layers within the Wasatch Formation.” (PRB FEIS page 4-64).

Development of CBNG through 2018 (and coal mining through 2033) would remove 4 million acre-feet of groundwater from the coal zone aquifer (PRB FEIS page 4-65). This volume of water “...cumulatively represents 0.5 percent of the recoverable groundwater stored in the Wasatch – Tongue River sands and coals (nearly 750 million acre-feet, from Table 3-5). All of the groundwater projected to be removed during reasonably foreseeable CBNG development and coal mining would represent less than 0.3 percent of the total recoverable groundwater in the Wasatch and Fort Union Formations within the PRB (nearly 1.4 billion acre-feet, from Table 3-5).” (PRB FEIS page 4-65).

4.2.4.1.3. Mitigation Measures

Adherence to the drilling COAs, the setting of casing at appropriate depths, following safe remedial procedures in the event of casing failure, and utilizing proper cementing procedures should protect any fresh water aquifers above the target coal zone. This will ensure that ground water will not be adversely impacted by well drilling and completion operations.

4.2.4.1.4. Residual Effects

The production of CBNG necessitates the removal of some degree of the water saturation in the coal zones to temporarily reduce the hydraulic head in the coal. The Buffalo Field Office has been monitoring coal zone pressures as expressed in depth to water from surface since the early 1990’s in the PRB.

The areas around and within TM2 POD have been intensely developed with CBNG production. As a result, the target coal zone pressure may have been reduced through off set water production.

4.2.4.2. Surface Water

4.2.4.2.1. Direct and Indirect Effects

Produced Water Quality

Table 4.2 shows the average values of EC and SAR as measured at selected USGS gauging stations at high and low monthly flows as well as the Wyoming groundwater quality standards for TDS and SAR for

Class I to Class III water (there is no current standard for EC). It also shows constituent limits for TDS, SAR and EC detailed in the project area WYPDES permit, and the concentrations found in the POD's representative water sample.

Table 4.2 Comparison of Regulated Water Quality Parameters to Predicted Water Quality

Sample location or Standard	TDS mg/l	SAR	EC µmhos/cm
Upper Powder River Watershed at Arvada, WY Gauging station			
Historic Data Average at Maximum Flow		4.76	1,797
Historic Data Average at Minimum Flow		7.83	3,400
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8)			
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000	8	
Livestock Use (Class III)	5,000		
WDEQ Water Quality Requirement for Permit UIC # 05-231, Class V, based on Class of Use water in Receiving Formation (Madison Formation) Class III	5,000		NA
Predicted Produced Water Quality			
Big George Coal Zone	1,000	12.5	1,600
Craney Spring	No Data	No Data	No Data
Thacker #1	883	8.9	1,300
Middle Water Spring	2,210	4.3	2,570

Based on the analysis performed in the PRB FEIS, the primary beneficial use of the surface water in the Powder River Basin is the irrigation of crops (PRB FEIS pg 4-69). The water quality projected for this POD is 1,000 mg/l TDS which is within the WDEQ criteria for agricultural use (2000 mg/l TDS). However direct land application is not included in this proposal. If at any future time the operator entertains the possibility of irrigation or land application with the water produced from these wells, the proposal must be submitted as a sundry notice for separate environmental analysis and approval by the BLM.

The quality for the water produced from the Big George coal zone from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 20 gallons per minute (gpm) is projected is to be produced from these 89 wells, for a total of 1,780 gpm for the POD.

In order to determine the actual water quality of the producing formations in this POD and to verify the water analysis submitted for the pre-approval evaluation, the operator has committed to designate a reference well to each coal zone within the POD boundary. The reference well will be sampled at the wellhead for analysis within sixty days of initial production. A copy of the water analysis will be submitted to the BLM Authorized Officer.

For more information, please refer to the WMP included in this POD.

Produced Water Control

Produced water will be piped directly to the Salt Creek Pipeline, and transported to Midwest where it will be injected into the Madison aquifer. Therefore, there will be no surface discharge associated with the TM2 POD.

4.2.4.2.2. Cumulative Effects

The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in

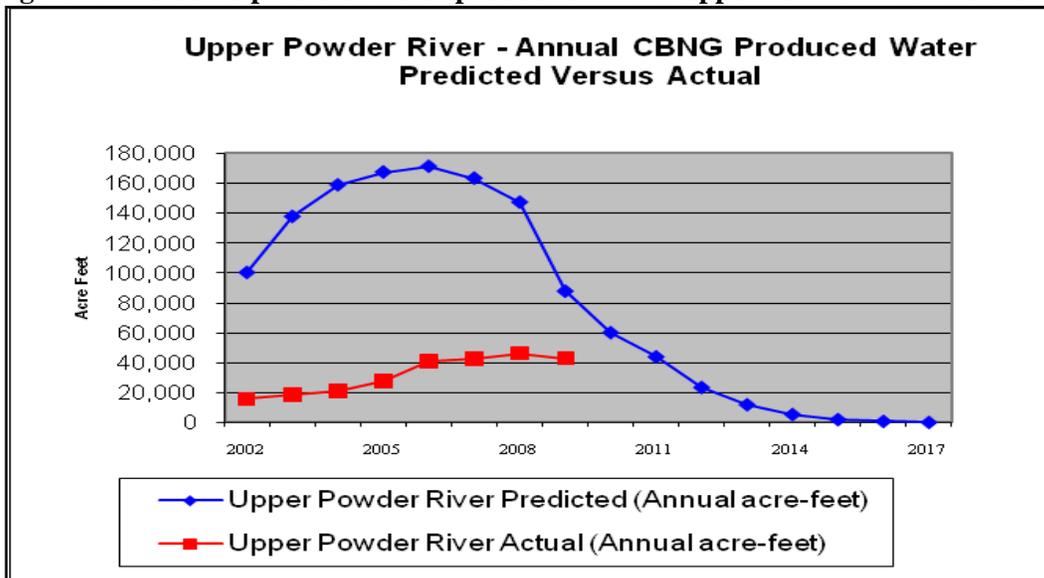
the Upper Powder River watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of December 2009, all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 255,531 acre-ft of water compared to the predicted 1,135,567 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Figure 4.2 and Table 4.3 following. This volume is 22.5 % of the total predicted produced water analyzed in the PRB FEIS for the Upper Powder River watershed.

Table 4.3 Actual vs predicted water production in the Upper Powder River watershed 2009 Data Update 04-06-10

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
2002	100,512	100,512	15,846	15.8	15,846	15.8
2003	137,942	238,454	18,578	13.5	34,424	14.4
2004	159,034	397,488	20,991	13.2	55,414	13.9
2005	167,608	565,096	27,640	16.5	83,054	14.7
2006	171,423	736,519	40,930	23.9	123,984	16.8
2007	163,521	900,040	42,112	25.8	166,096	18.5
2008	147,481	1,047,521	45,936	31.1	212,522	20.3
2009	88,046	1,135,567	43,009	48.8	255,531	22.5
2010	60,319	1,195,886				
2011	44,169	1,240,055				
2012	23,697	1,263,752				
2013	12,169	1,275,921				
2014	5,672	1,281,593				
2015	2,242	1,283,835				
2016	1,032	1,284,867				
2017	366	1,285,233				
Total	1,285,233		255,531			

Figure 4.2 Actual vs predicted water production in the Upper Powder River watershed



The PRB FEIS identified downstream irrigation water quality as the primary issue for CBNG produced water. Electrical Conductivity (EC) and SAR are the parameters of concern for suitability of irrigation water. The water quality analysis in the PRB FEIS was conducted using produced water quality data, where available, from existing wells within each of the ten primary watersheds in the Powder River Basin. These predictions of EC and SAR can only be reevaluated when additional water quality sampling is available.

As referenced above, the PRB FEIS did disclose that cumulative impacts may occur as a result of discharged produced CBNG water. The cumulative effects relative to this project are within the analysis parameters and impacts described in the PRB FEIS for the following reasons:

1. They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 22.5% of the total predicted in the PRB FEIS.
2. This project will not discharge any CBNG produced water to the surface.

Refer to the PRB FEIS, Volume 2, page 4-115 – 117 and table 4-13 for cumulative effects relative to the Upper Powder River watershed and page 117 for cumulative effects common to all sub-watersheds.

4.2.4.2.3. Mitigation Measures

Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM. Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.

The operator has also committed to expediently stabilize and revegetate disturbance within channel and floodplain associated with this project.

4.2.4.2.4. Residual Effects

“ Downcutting (stream erosion) and sediment deposition (aggradation) are natural processes that occur as stream drainages age through time. Downcutting occurs within the upper reaches of a drainage system as

the stream channel becomes incised through erosion, until the slope of the stream and its velocity are reduced and further erosion is limited. Sediment is deposited within the lower, slower reaches of a stream.

Surface drainages could be degraded from erosion caused by increased surface flow, Increased flows could cause downcutting in fluvial environments, resulting in increased channel capacity over time within the upper and middle reaches of surface drainages.” (PRB FEIS pg 4-118).

4.2.5. Economics and Recovery of CBNG Resources

4.2.5.1. Direct and Indirect Effects

Direct and indirect effects to the socioeconomic structure of Johnson and Campbell counties as a result of project implementation would be as described in the PRB FEIS. Likewise, cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS starting on page 4-336. No mitigation is warranted and no residual effects are expected.

CBM Gas lost without any surrounding wells drilled				
TWP	RNG	Sec	Well Name	Unrecovered CBM MMCFG
45N	76W	27	TM-CBM Fed 4576 27-14	711.567
45N	76W	27	TM-CBM Fed 4576 27-23	711.551
45N	76W	21	TM-CBM Fed 4576 21-12	813.919

CBM Gas lost if surrounding 80 acres wells are drilled				
TWP	RNG	Sec	Well Name	Unrecovered CBM MMCFG
45N	76W	27	TM-CBM Fed 4576 27-14	78.272
45N	76W	27	TM-CBM Fed 4576 27-23	78.271
45N	76W	21	TM-CBM Fed 4576 21-12	89.531

4.2.6. Cultural Resources

4.2.6.1. Direct and Indirect Effects

A portion of The Table Mountain 2 project is proposed within 2 miles of, and within the viewshed of the Pumpkin Buttes TCP (48CA268). As designed, construction of all wells and associated infrastructure will result in “no adverse effect” to the setting of the Pumpkin Buttes TCP. The determination is dependent on Anadarko committing to the mitigation measures described in appendices A-G of the Programmatic Agreement between the Bureau of Land Management and the Wyoming State Historic Preservation Officer Regarding Mitigation of Adverse Effects to the Pumpkin Buttes Traditional Cultural Property from Anticipated Federal Minerals Development in Campbell County, Wyoming (Pumpkin Buttes PA). The mitigation measures are standard BMPs intended to reduce visual contrast and will be incorporated during all phases (drilling, construction, operation, reclamation, etc) of all approved wells in the Table Mountain 2 POD and their associated infrastructure within T45N R76W Sections 26, 27, 28, 33, and 34.

Non-eligible site(s) 48CA470, 48CA1543, 48CA1567 will be impacted by the proposed project. The proposed project will also be visible from the Pumpkin Buttes TCP (48CA268), but will cause a weak contrast to the setting of the TCP. Following the Wyoming State Protocol Section VI(B)(4) the Bureau of Land Management electronically notified the Wyoming State Historic Preservation Officer (SHPO) on 9/30/2010 of a finding of No Adverse Effect for the project.

4.2.6.2. Cumulative Effects

Construction and development of oil and gas resources impacts cultural resources through ground

disturbance, unauthorized collection, and visual intrusion of the setting of historic properties. This results in fewer archaeological resources available for study of past human life-ways, changes in human behavior through time, and interpreting the past to the public. Additionally, these impacts may compromise the aspects of integrity that make a historic property eligible for the National Register of Historic Places. Recording and archiving basic information about archaeological sites and the potential for subsurface cultural materials in the proposed project area serve to partially mitigate potential cumulative effects to cultural resources.

Fee actions constructed in support of federal actions can result in impacts to historic properties. Construction of large plans of coalbed natural gas development on split estate often include associated infrastructure that is not permitted through BLM. Project applicants may connect wells draining fee minerals, or previously constructed pipelines on fee surface with a federal plan of development. BLM has no authority over such development which can impact historic properties. BLM has the authority to modify or deny approval of federal undertakings on private surface, but that authority is limited to the extent of the federal approval. Historic properties on private surface belong to the surface owner and they are not obligated to preserve or protect them. The BLM may go to great lengths to protect a site on private surface from a federal undertaking, but the same site can be legally impacted by the landowner at any time. The cumulative effect of numerous federal approvals can result in impacts to historic properties. Archeological inventories reveal the location of sites and although the BLM goes to great lengths to protect site location data, that information can potentially get into the wrong hands. BLM authorizations that result in new access can inadvertently lead to impacts to sites from increased visitation by the public.

4.2.6.3. Mitigation Measures

The incorporation of the mitigation measures to reduce visual contrast as outlined in the appendices of the Pumpkin Buttes PA will result in a finding of “no adverse effect” to the Pumpkin Buttes TCP. These mitigating measures include techniques such as narrow corridor widths, painting facilities with environmentally friendly colors, and a reduction of vegetation and surface disturbance.

Per the Programmatic Agreement between the Bureau of Land Management and the Wyoming State Historic Preservation Officer Regarding Mitigation of Adverse Effects to the Pumpkin Buttes Traditional Cultural Property from Anticipated Federal Minerals Development in Campbell County, Wyoming; Appendix A-G; Anadarko will operate under mitigation measures found in appendices A-G of the PA during all phases (drilling, construction, operation, reclamation, etc) of all approved wells in the Table Mountain 2 POD and their associated infrastructure (new surface disturbance to junction with existing disturbance) within T45N R76W Sections 26, 27, 28, 33 and 34.

The BLM has identified areas within the POD with a high potential for buried cultural deposits. These areas will require an archaeological monitor during construction. The specific requirements and areas are described in Cultural site specific COA #3.

If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the Standard COA (General)(A)(1).

4.2.6.4. Residual Effects

During the construction phase, there will be numerous crews working across the project area using heavy construction equipment without the presence of archaeological monitors. Due to the extent of work and the surface disturbance caused by large vehicles, it is possible that unidentified cultural resources can be damaged by construction activities. The increased human presence associated with the construction phase can also lead to unauthorized collection of artifacts or vandalism of historic properties.

4.2.7. Air Quality

4.2.7.1. Direct and Indirect Effects

In the project area, air quality impacts would occur during construction (due to surface disturbance by earth-moving equipment, vehicle traffic fugitive dust, well testing, as well as drilling rig and vehicle engine exhaust) and production (including non-CBM well production equipment, booster and pipeline compression engine exhaust). The amount of air pollutant emissions during construction would be controlled by watering disturbed soils, and by air pollutant emission limitations imposed by applicable air quality regulatory agencies. Air quality impacts modeled in the PRB FEIS concluded that projected oil & gas development would not violate any local, state, tribal or federal air quality standards.

4.3. Summary of Effects

Table 4.4 provides a comparison of the cumulative effects associated with the alternatives.

Resource/Species	Alternative A	Alternative B
Wetlands/Riparian Areas	No existing wetlands/riparian areas would be disturbed.	
Wildlife		
Big Game	No habitat loss or fragmentation. Would likely see increased traffic passing through due to surrounding mineral development	345 acres of habitat loss. 89 wells and 53 miles of access/utility will fragment habitat.
Raptors	No habitat loss. No wells authorized near nests.	Greatest foraging habitat fragmentation.
Migratory Birds	No habitat loss. No habitat fragmentation.	345 acres of habitat loss. 89 wells and 53 miles of access/utility will fragment habitat.
Threatened and Endangered Species		
Bald eagle	No habitat loss	Increased disturbance.
Sensitive Species		
Greater Sage Grouse	No habitat loss.	Greatest habitat loss.

5. CONSULTATION & COORDINATION

Agencies summarized in Table 5.1 were consulted on the proposed project to confirm compliance with applicable laws and regulations.

Table 5.1 Consultations

Contact	Title	Organization	Present at Onsite
Mary Hopkins	Wyoming State Historic Preservation Officer	WY SHPO	No
Curt Downing	Civil Engineer	Earth Work Solutions	Yes
Scott Millinten	Operations	Anadarko	Yes
Chuck Cornelius	Construction	Anadarko	Yes
Katie Taylor	GIS	BLM	Yes
Colt Rodeman	Operations	Anadarko	Yes
Josh Carlisle	Operations	Anadarko	Yes
Joy Kennedy	Operations	Anadarko	Yes
Tim Gimble	Drilling Supervisor	Anadarko	Yes
John Christensen	Landowner	Landowner	Yes
Robert Christensen	Landowner	Landowner	Yes
Larry Brubaker	Landowner	Landowner	Yes
Chantill Recker	Reclamation	Anadarko	Yes
Derek Hensley	Reclamation	Anadarko	Yes
Clint Beaver	Land man	Anadarko	Yes
Shane Henke	Surveyor	LSI	Yes
Eric Kessner	Surveyor	LSI	Yes
Brad Rogers	Wildlife Biologist	WY Fish &Game	No
Pauline Schuette	Wildlife Biologist	WY Fish &Game	No

6. OTHER PERMITS REQUIRED

A number of other permits are required from Wyoming State and other Federal agencies. These permits are identified in Table A-1 in the PRB FEIS Record of Decision.

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8. LIST OF INTERDISCIPLINARY TEAM PREPARERS AND REVIEWERS

Andy Perez, Natural Resource Specialist
Casey Freise, Supervisory Natural Resource Specialist
Raymond Stott, Hydrology
Christine Tellock, Legal Instruments Examiner
Clint Crago, Archaeologist
Don Brewer, Wildlife Biologist
Stacy Gunderson, Civil Engineer
Kerry Aggen, Geologist
Denise Oliverius, Realty Specialist
Chris Durham, Assistant Field Manager, Resources
Paul Beels if applicable, Associate Field Manager, Minerals & Lands
Duane W. Spencer, Field Manager

Interdisciplinary Team Lead : Andy Perez

**APPENDIX A: CONDITIONS OF APPROVAL FOR THE APPLICATION
FOR PERMIT TO DRILL**

POD Name: Table Mountain Phase 2 Federal POD

Operator Name: Anadarko Petroleum Corporation

Field Office: Buffalo Field Office
Address: 1425 Fort Street
Buffalo, Wyoming 82834

Office Telephone Number: 307-684-1100

List of Wells:

	Well Name	Well #	QTR	Sec	TWN	RNG	Lease
1	TABLE MOUNTAIN 2 TM CBM	1-12*	SWNW	1	44N	77W	WYW13956
2	TABLE MOUNTAIN 2 TM CBM	1-32	SWNE	1	44N	77W	WYW13956
3	TABLE MOUNTAIN 2 TM CBM	1-34	SWSE	1	44N	77W	WYW52285
4	TABLE MOUNTAIN 2 TM CBM	1-43	NESE	1	44N	77W	WYW52285
5	TABLE MOUNTAIN 2 TM CBM	2-12	SWNW	2	44N	77W	WYW13956
6	TABLE MOUNTAIN 2 TM CBM	2-32	SWNE	2	44N	77W	WYW52285
7	TABLE MOUNTAIN 2 TM CBM	3-32	SWNE	3	44N	77W	WYW13956
8	TABLE MOUNTAIN 2 TM CBM	3-12	SWNW	3	45N	76W	WYW51703
9	TABLE MOUNTAIN 2 TM CBM	3-14	SWSW	3	45N	76W	WYW72485
10	TABLE MOUNTAIN 2 TM CBM	3-21	NENW	3	45N	76W	WYW0309257
11	TABLE MOUNTAIN 2 TM CBM	3-23	NESW	3	45N	76W	WYW51704
12	TABLE MOUNTAIN 2 TM CBM	3-32	SWNE	3	45N	76W	WYW51703
13	TABLE MOUNTAIN 2 TM CBM	3-34	SWSE	3	45N	76W	WYW51704
14	TABLE MOUNTAIN 2 TM CBM	3-41	NENE	3	45N	76W	WYW51703
15	TABLE MOUNTAIN 2 TM CBM	3-43	NESE	3	45N	76W	WYW51703
16	TABLE MOUNTAIN 2 TM CBM	6-12	SWNW	6	45N	76W	WYW0266651
17	TABLE MOUNTAIN 2 TM CBM	6-14	SWSW	6	45N	76W	WYW0266651
18	TABLE MOUNTAIN 2 TM CBM	6-21	NENW	6	45N	76W	WYW0266651
19	TABLE MOUNTAIN 2 TM CBM	6-23	NESW	6	45N	76W	WYW0266651
20	TABLE MOUNTAIN 2 TM CBM	6-41	NENE	6	45N	76W	WYW0266651
21	TABLE MOUNTAIN 2 TM CBM	7-12	SWNW	7	45N	76W	WYW0266651
22	TABLE MOUNTAIN 2 TM CBM	7-21	NENW	7	45N	76W	WYW0266651
23	TABLE MOUNTAIN 2 TM CBM	11-12	SWNW	11	45N	76W	WYW5955

	Well Name	Well #	QTR	Sec	TWN	RNG	Lease
24	TABLE MOUNTAIN 2 TM CBM	18-14	SWSW	18	45N	76W	WYW89851
25	TABLE MOUNTAIN 2 TM CBM	18-21	NENW	18	45N	76W	WYW89851
26	TABLE MOUNTAIN 2 TM CBM	18-23	NESW	18	45N	76W	WYW89851
27	TABLE MOUNTAIN 2 TM CBM	21-14	SWSW	21	45N	76W	WYW41473
28	TABLE MOUNTAIN 2 TM CBM	21-23	NESW	21	45N	76W	WYW41473
29	TABLE MOUNTAIN 2 TM CBM	22-12	SWNW	22	45N	76W	WYW21220
30	TABLE MOUNTAIN 2 TM CBM	22-14	SWSW	22	45N	76W	WYW41473
31	TABLE MOUNTAIN 2 TM CBM	22-23	NESW	22	45N	76W	WYW41473
32	TABLE MOUNTAIN 2 TM CBM	27-32	SWNE	27	45N	76W	WYW89859
33	TABLE MOUNTAIN 2 TM CBM	27-41	NENE	27	45N	76W	WYW89859
34	TABLE MOUNTAIN 2 TM CBM	28-14	SWSW	28	45N	76W	WYW89852
35	TABLE MOUNTAIN 2 TM CBM	28-23	NESW	28	45N	76W	WYW89852
36	TABLE MOUNTAIN 2 TM CBM	28-32	SWNE	28	45N	76W	WYW0266653
37	TABLE MOUNTAIN 2 TM CBM	28-41	NENE	28	45N	76W	WYW0266653
38	TABLE MOUNTAIN 2 TM CBM	1-43	NESE	1	45N	77W	WYW89851
39	TABLE MOUNTAIN 2 TM CBM	2-12	SWNW	2	45N	77W	WYW128454
40	TABLE MOUNTAIN 2 TM CBM	2-21	NENW	2	45N	77W	WYW128454
41	TABLE MOUNTAIN 2 TM CBM	3-12	SWNW	3	45N	77W	WYW128465
42	TABLE MOUNTAIN 2 TM CBM	3-14	SWSW	3	45N	77W	WYW128454
43	TABLE MOUNTAIN 2 TM CBM	3-23	NESW	3	45N	77W	WYW128454
44	TABLE MOUNTAIN 2 TM CBM	3-32	SWNE	3	45N	77W	WYW128465
45	TABLE MOUNTAIN 2 TM CBM	3-34	SWSE	3	45N	77W	WYW128454
46	TABLE MOUNTAIN 2 TM CBM	3-41	NENE	3	45N	77W	WYW128454
47	TABLE MOUNTAIN 2 TM CBM	3-43	NESE	3	45N	77W	WYW128454
48	TABLE MOUNTAIN 2 TM CBM	4-12	SWNW	4	45N	77W	WYW128454
49	TABLE MOUNTAIN 2 TM CBM	4-21	NENW	4	45N	77W	WYW128454
50	TABLE MOUNTAIN 2 TM CBM	4-23	NESW	4	45N	77W	WYW128454
51	TABLE MOUNTAIN 2 TM CBM	4-32	SWNE	4	45N	77W	WYW128454
52	TABLE MOUNTAIN 2 TM CBM	4-34	SWSE	4	45N	77W	WYW128454
53	TABLE MOUNTAIN 2 TM CBM	4-41	NENE	4	45N	77W	WYW128454
54	TABLE MOUNTAIN 2 TM CBM	4-43	NESE	4	45N	77W	WYW128454
55	TABLE MOUNTAIN 2 TM CBM	9-14	SWSW	9	45N	77W	WYW128454
56	TABLE MOUNTAIN 2 TM CBM	9-23	NESW	9	45N	77W	WYW128454
57	TABLE MOUNTAIN 2 TM CBM	9-34	SWSE	9	45N	77W	WYW0275186

	Well Name	Well #	QTR	Sec	TWN	RNG	Lease
58	TABLE MOUNTAIN 2 TM CBM	9-41	NENE	9	45N	77W	WYW112974
59	TABLE MOUNTAIN 2 TM CBM	9-43	NESE	9	45N	77W	WYW0275186
60	TABLE MOUNTAIN 2 TM CBM	10-12	SWNW	10	45N	77W	WYW89853
61	TABLE MOUNTAIN 2 TM CBM	10-14	SWSW	10	45N	77W	WYW0275186
62	TABLE MOUNTAIN 2 TM CBM	10-21	NENW	10	45N	77W	WYW89853
63	TABLE MOUNTAIN 2 TM CBM	10-23	NESW	10	45N	77W	WYW0275186
64	TABLE MOUNTAIN 2 TM CBM	10-34	SWSE	10	45N	77W	WYW0275186
65	TABLE MOUNTAIN 2 TM CBM	10-41	NENE	10	45N	77W	WYW128464
66	TABLE MOUNTAIN 2 TM CBM	10-43	NESE	10	45N	77W	WYW0275186
67	TABLE MOUNTAIN 2 TM CBM	14-14	SWSW	14	45N	77W	WYW125418
68	TABLE MOUNTAIN 2 TM CBM	15-12	SWNW	15	45N	77W	WYW0275186
69	TABLE MOUNTAIN 2 TM CBM	15-21	NENW	15	45N	77W	WYW0275186
70	TABLE MOUNTAIN 2 TM CBM	15-32	SWNE	15	45N	77W	WYW0275186
71	TABLE MOUNTAIN 2 TM CBM	15-34	SWSE	15	45N	77W	WYW0275186
72	TABLE MOUNTAIN 2 TM CBM	15-43	NESE	15	45N	77W	WYW0275187
73	TABLE MOUNTAIN 2 TM CBM	27-14	SWSW	27	46N	76W	WYW20291
74	TABLE MOUNTAIN 2 TM CBM	27-23	NESW	27	46N	76W	WYW20291
75	TABLE MOUNTAIN 2 TM CBM	33-14	SWSW	33	46N	77W	WYW128454
76	TABLE MOUNTAIN 2 TM CBM	33-23	NESW	33	46N	77W	WYW146305
77	TABLE MOUNTAIN 2 TM CBM	33-34	SWSE	33	46N	77W	WYW128454
78	TABLE MOUNTAIN 2 TM CBM	33-43	NESE	33	46N	77W	WYW146305
79	TABLE MOUNTAIN 2 TM CBM	34-12	SWNW	34	46N	77W	WYW89865
80	TABLE MOUNTAIN 2 TM CBM	34-14	SWSW	34	46N	77W	WYW89865
81	TABLE MOUNTAIN 2 TM CBM	34-21	NENW	34	46N	77W	WYW89865
82	TABLE MOUNTAIN 2 TM CBM	34-23	NESW	34	46N	77W	WYW89865
83	TABLE MOUNTAIN 2 TM CBM	34-32	SWNE	34	46N	77W	WYW89865
84	TABLE MOUNTAIN 2 TM CBM	34-34	SWSE	34	46N	77W	WYW89865
85	TABLE MOUNTAIN 2 TM CBM	34-41	NENE	34	46N	77W	WYW89865
86	TABLE MOUNTAIN 2 TM CBM	34-43	NESE	34	46N	77W	WYW89865

Rights-of-Way:

The following right-of-way locations were identified with the Table Mountain 2 POD for a road and/or road/utility corridor. Construction of the following locations is prohibited until authorized rights-of-ways have been issued for the following locations:

- T. 45 N., R. 77 W., sec. 3, 4, 10, 11, 34;
- T. 46 N., R. 77 W., sec. 33, 34, 35.

SITE SPECIFIC CONDITIONS OF APPROVAL

Surface Use

1. All permanent aboveground structures (e.g., production equipment, tanks, etc.) not subject to safety requirements will be painted to blend with the natural color of the landscape. The paint used will be a color which simulates “Standard Environmental Colors.” The color selected for this Table Mountain Phase 2 CBNG POD is Covert Green.
2. All engineered road segments must be complete, including culverts and low water crossings before the drilling rig or other drilling equipment moves on to the well pad.
3. Due to poor reclamation potential, potential erosion, surface disturbance, and topography the operator has submitted detailed POD specific reclamation plan for locations agreed upon at the onsite. A 30-Day Stabilization COA will apply to the locations discussed in the reclamation plans which include: cross country utility corridors, utility corridors, slots, engineered pads and engineered roads as referenced in the table below.

	Site #	Well #	Site Type
1	TM2_1	4576 7-12	Road
2	TM2_10	4577 3-12	Pad
3	TM2_100	4676 27-23	Pad
4	TM2_101	4676 27-23	Road
5	TM2_102	4676 27-23	Road
6	TM2_105	4576 3-14	Road
7	TM2_106	4576 3-14	Road
8	TM2_108	4576 11-12	Pad
9	TM2_109	4576 3-34	Pad
10	TM2_11	4577 3-12	Road
11	TM2_110	4477 1-32	Pad
12	TM2_111	4477 1-32	Pad
13	TM2_112	4477 1-12	Pad
14	TM2_113	4477 2-12	Pad
15	TM2_114	4477 2-12	Road
16	TM2_115	4477 3-32	Pad
17	TM2_116	4577 9-34	Pad
18	TM2_117	4576 3-34	Road
19	TM2_12	4577 4-43	Pad
20	TM2_13	4577 9-14	Pad
21	TM2_14	4577 9-23	Road
22	TM2_15	4577 9-23	Road
23	TM2_16	4577 Sec 4, 9, 10, 15	Road
24	TM2_17	4577 Sec 4, 9, 10, 15	Road
25	TM2_18	4577 Sec 4, 9, 10, 15	Road
26	TM2_19	4577 Sec 4, 9, 10, 15	Road
27	TM2_2	4576 7-12	Pad

	Site #	Well #	Site Type
28	TM2_20	4577 Sec 4, 9, 10, 15	Road
29	TM2_200	4576 27-14	Road
30	TM2_201	4576 28-14	Pad
31	TM2_202	4576 28-14	Road
32	TM2_205	4576 22-14	Slot
33	TM2_206	4576 22-14	Road
34	TM2_207	4576 22-14	Road
35	TM2_21	4577 Sec 4, 9, 10, 15	Road
36	TM2_22	4577 Sec 4, 9, 10, 15	Road
37	TM2_23	4577 Sec 4, 9, 10, 15	Road
38	TM2_24	4577 4-23	Road
39	TM2_25	4577 4-23	Pad
40	TM2_26	4577 4-21	Road
41	TM2_27	4677 33-34	Road
42	TM2_28	4677 33-23	Pad
43	TM2_29	4677 33-14	Pad
44	TM2_3	4576 7-21	Slot
45	TM2_30	4577 4-12	Pad
46	TM2_300	4577 15-34	Pad
47	TM2_301	4577 10-34	Road
48	TM2_302	4577 10-43	Pad
49	TM2_303	4577 10-41	Road
50	TM2_304	4577 10-41	Road
51	TM2_305	4577 9-41	Slot
52	TM2_306	4576 27-32	Road
53	TM2_307	4576 28-32	Pad
54	TM2_308	4576 28-41	Road
55	TM2_309	4576 21-23	Pad
56	TM2_31	4677 34-14	Road
57	TM2_310	4576 22-12	Road
58	TM2_311	4577 3-14	Road
59	TM2_312	4577 10-12	Pad
60	TM2_313	4577 3-34	Pad
61	TM2_314	4577 3-32	Pad
62	TM2_315	4577 2-12	Pad
63	TM2_316	4677 34-32	Pad/Road
64	TM2_317	4677 34-41	Pad/Road
65	TM2_318	4576 18-21	Road
66	TM2_319	4576 6-14	Pad
67	TM2_32	4677 33-43	Pad

	Site #	Well #	Site Type
68	TM2_320	4577 2-12	Road
69	TM2_321	4577 2-12	Road
70	TM2_322	4576 3-32/3-41	Corridor
71	TM2_324	4577 3-32	Road
72	TM2_325	4577 3-32	Road
73	TM2_326	4577 3-32	Road
74	TM2_33	4677 33-43	Road
75	TM2_34	4677 33-43	Road
76	TM2_35	4677 34-12	Road
77	TM2_36	4677 34-12	Pad
78	TM2_37	4677 34-23	Pad
79	TM2_38	4677 34-21	Pad
80	TM2_4	4576 7-21	Road
81	TM2_5	4576 6-41	Pad
82	TM2_6	4576 6-23	Road
83	TM2_7	4576 6-21	Pad
84	TM2_8	4576 6-21	Road
85	TM2_9	4576 6-12	Road

4. All drilling pits will be required to be lined due to the sandy soils that occur throughout the POD.
5. The operator would follow the guidance provided in the Wyoming Policy on Reclamation (Instruction Memorandum WY-90-231). The Wyoming Reclamation Policy applies to all surface-disturbing activities. Authorizations for surface-disturbing actions are based upon the assumptions that an area can and ultimately would be successfully reclaimed. BLM reclamation goals emphasize eventual ecosystem reconstruction, which means returning the land to a condition approximate to an approved "Reference Site" or Natural Resources Conservation Service Ecological Site Transition State. Final reclamation measures are used to achieve this goal. BLM reclamation goals also include the short-term goal of quickly stabilizing disturbed areas to protect both disturbed and adjacent undisturbed areas from unnecessary degradation. Interim reclamation measures are used to achieve this short-term goal.
6. The operator will seed all BLM lands within the POD with the Sandy Seed mix identified within the Table Mountain Phase 2 Federal POD Reclamation Plans for Wells/Roads 8-31-2010 page 11 for the following locations listed below:

	BLM Well #
1	4577 1-43
2	4577 2-12
3	4577 2-21
4	4577 3-32
5	4577 3-41
6	4577 3-43

	BLM Well #
7	4577 4-41
8	4577 10-21
9	4577 10-34
10	4577 10-41
11	4577 10-43
12	4577 15-12
13	4577 15-21
14	4577 15-32
15	4577 15-34
16	4577 15-44
17	4677 33-14
18	4677 33-23
19	4677 33-34
20	4677 33-43
21	4677 34-12
22	4677 34-14
23	4677 34-21
24	4677 34-23
25	4677 34-32
26	4677 34-34
27	4677 34-41
28	4677 34-43

7. In an effort to minimize disturbance in the area of Anadarko Petroleum Corporation's (Anadarko) Table Mountain 2 Plan of Development (POD) and Williams Production, RMT's (Williams) Culp-Hartzog Draw POD, both operators must utilize common roads and corridors as identified in the Table Mountain 2 POD Map D.

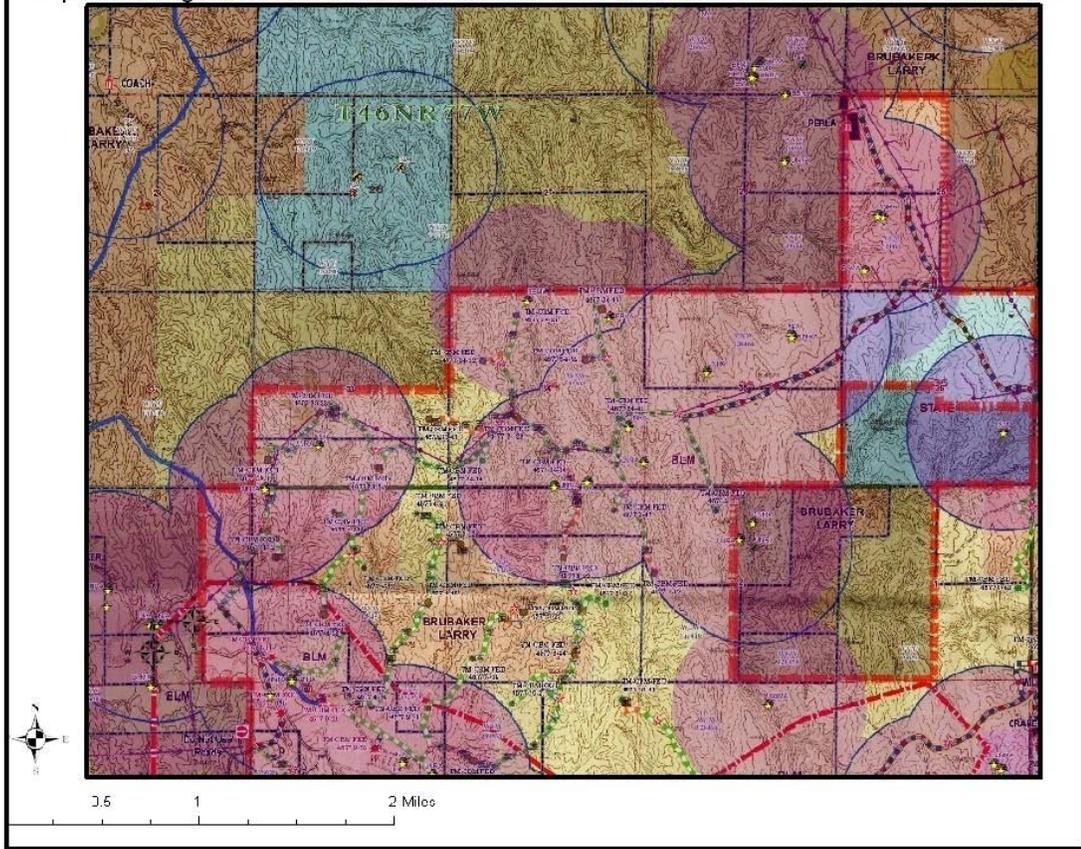
Wildlife

Raptors

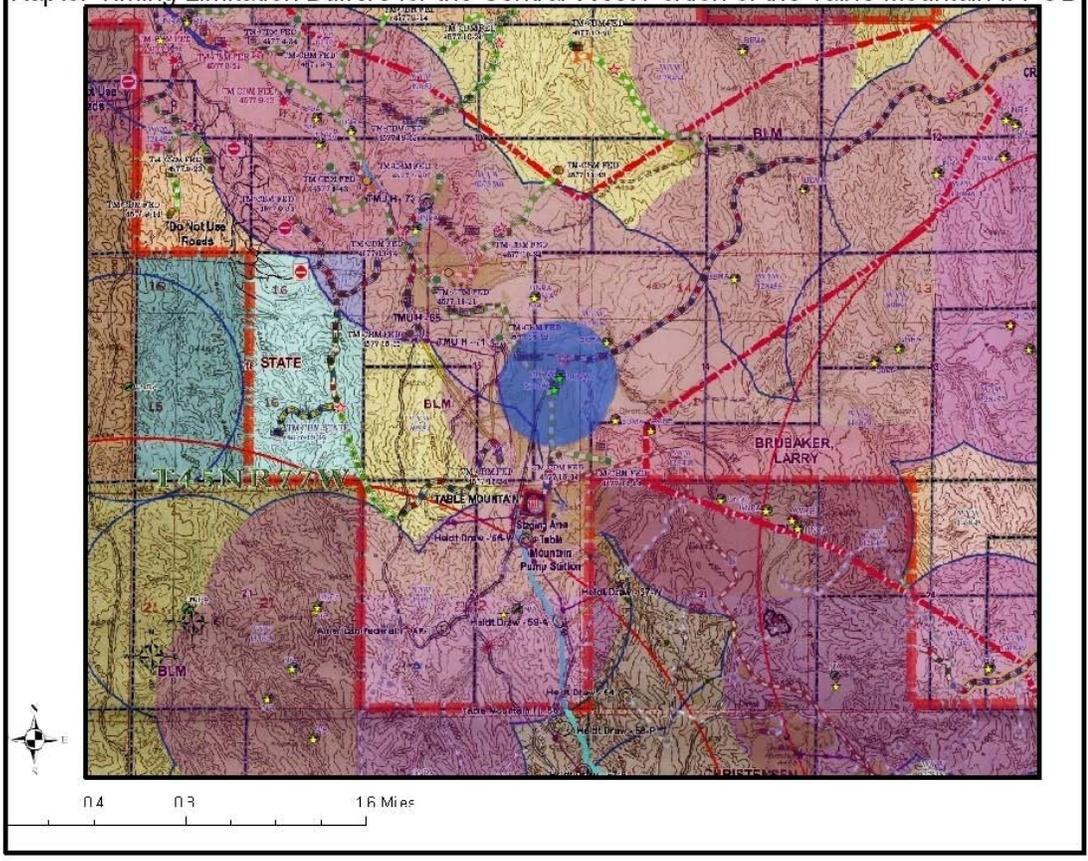
The following conditions will alleviate impacts to raptors:

1. No surface-disturbing activities shall occur within 0.5 mile of all identified raptor nests, from 1 February through 31 July, annually, prior to a nesting survey. This timing limitation will be in effect unless surveys determine the nest to be inactive. Refer to the attached raptor protection buffer maps for affected wells and infrastructure.
 - a. Surveys shall be conducted by a biologist following BLM protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
 - b. If an undocumented raptor nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.

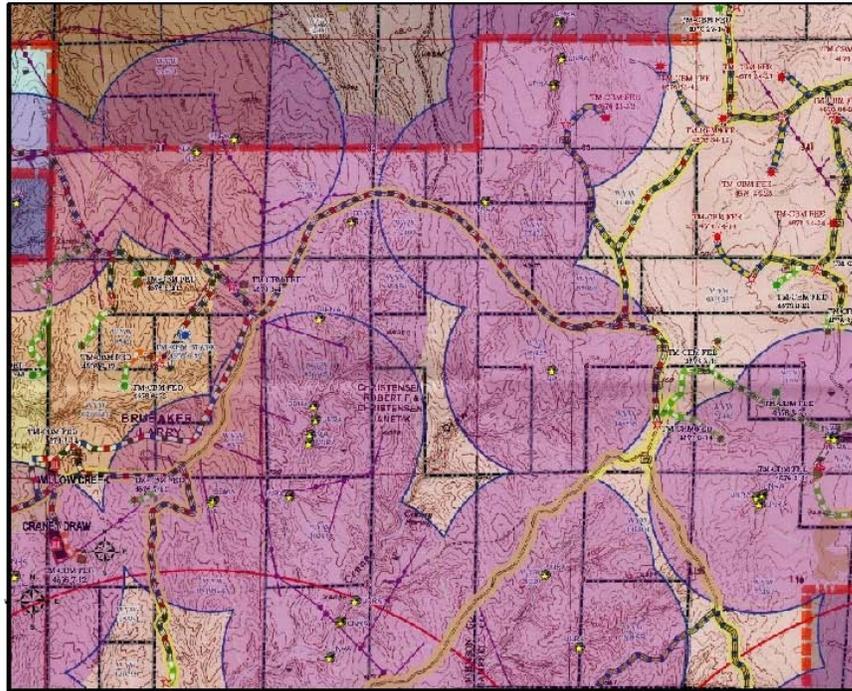
Raptor Timing Limitation Buffers for the Northwest Portion of the Table Mountain II POD



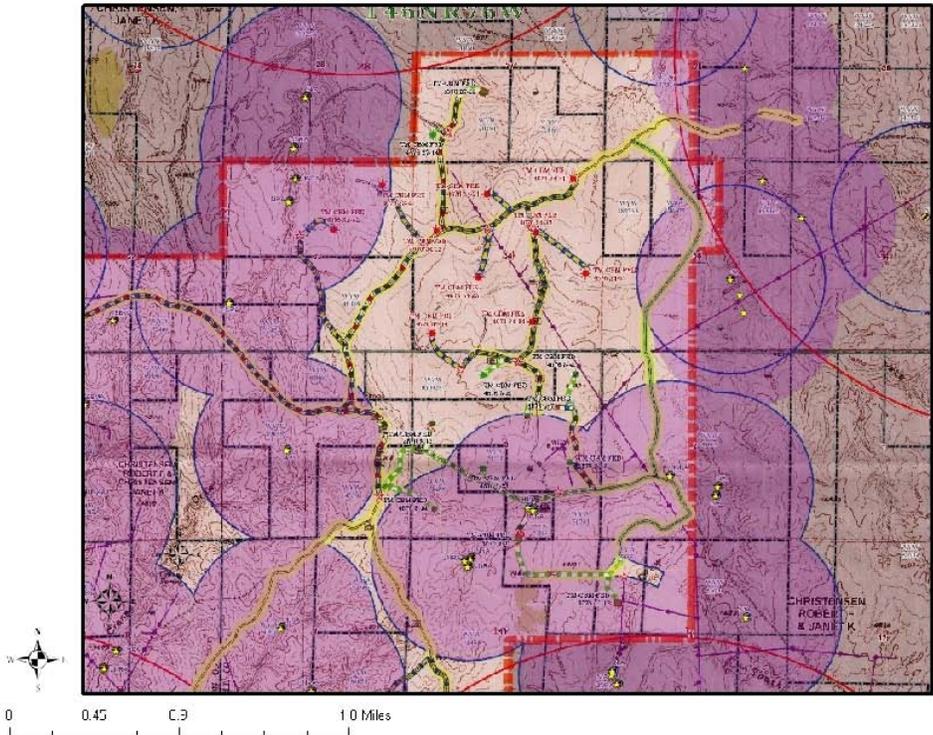
Raptor Timing Limitation Buffers for the Central West Portion of the Table Mountain II POD



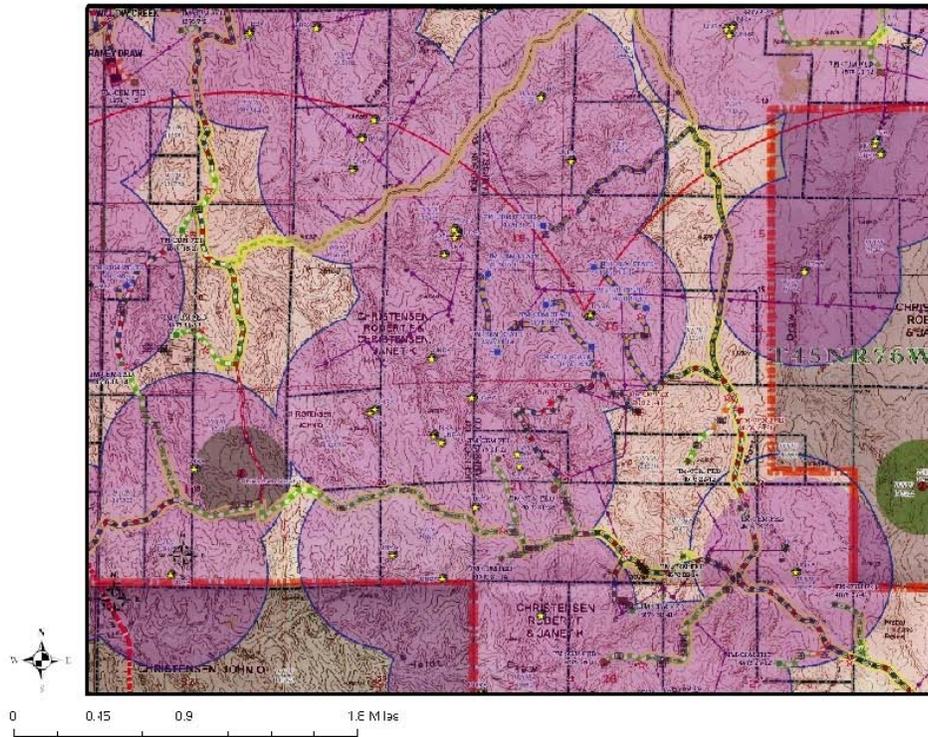
Raptor Timing Limitation Buffers for the North Central Portion of the Table Mountain II POD



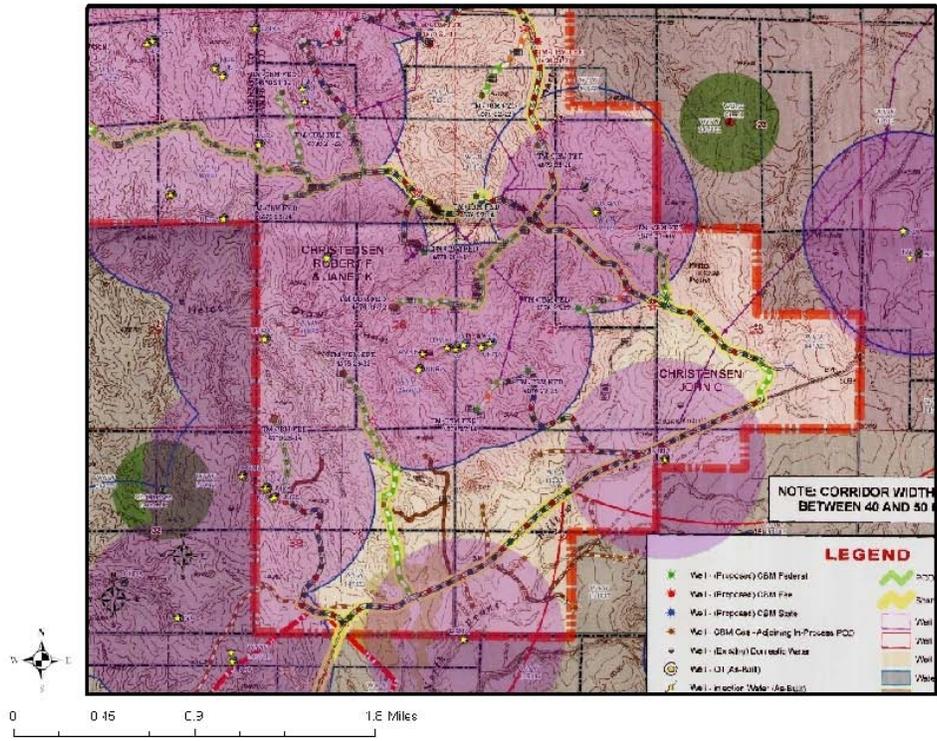
Raptor Timing Limitation Buffers for the Northeast Portion of the Table Mountain II POD



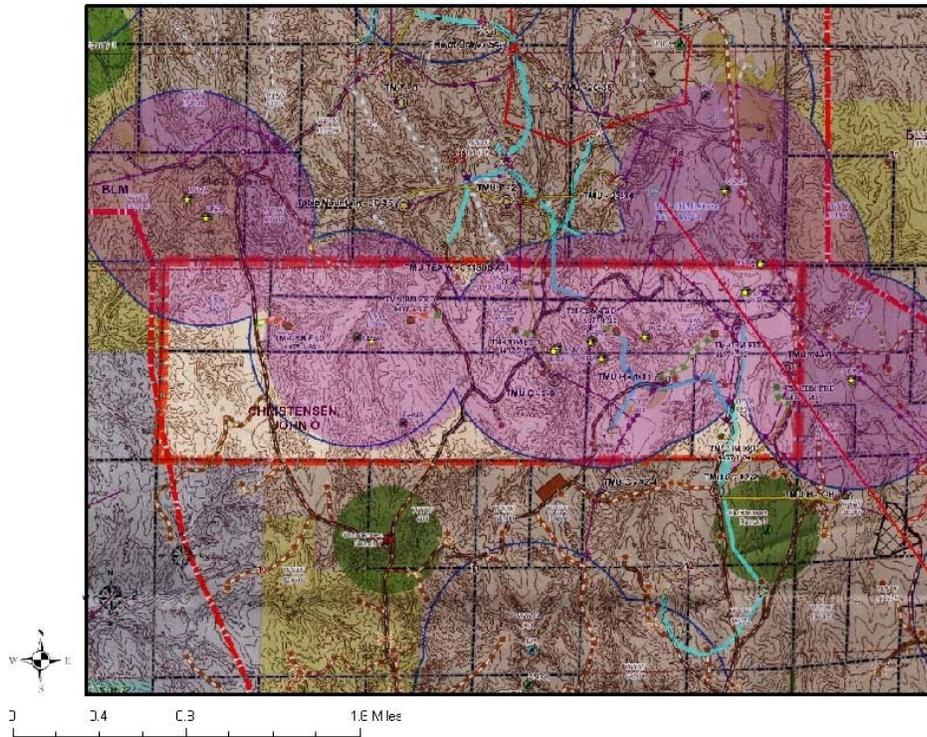
Raptor Timing Limitation Buffers for the Central Portion of the Table Mountain II POD



Raptor Timing Limitation Buffers for the Southeast Portion of the Table Mountain II POD



Raptor Timing Limitation Buffers for the Southwest Portion of the Table Mountain II POD



LEGEND

Well - (Proposed) CBM Federal	POD Access Route	Shared Access to Be Built According to WPC Approved PODs
Well - (Proposed) CBM Fee	Shared Access With WPC	
Well - (Proposed) CBM State	Well Pad (Proposed)	
Well - CBM Gas - Adjoining In-Process POD	Well - Total Disturbance (Proposed)	
Well - (Existing) Domestic Water	Well - Pad (As-Built)	
Well - Oil (As-Built)	Water - (Approved) Sub Station	
Well - Injection Water (As-Built)	Water - (Approved) Pump Station	
Well - Gas Federal (As-Built)	Water - Reservoir (As-Built)	
Well - Gas Fee (As-Built)	Water - Pump Station (Existing)	
Well - Gas State (As-Built)	Staging Area (Existing)	
Water - Culvert (Proposed)	Pipe Storage Yard (As-Built)	
Water - Low Water Crossing (Proposed)	Staging Area - (Proposed)	
Water - Water Source (Proposed)	Topsoil Pile - (Existing)	
Water - Headcut (Existing)	Compressor Station (Existing)	
Water - Spring (Existing)	Mines	
Water - Culvert (As-Built)	Lease Outlines	
Water - Culvert (Existing)	Table Mountain Phase 2 POD	
Water - Discharge Point (Existing)	TM Conventional Boundary	
Water - Stock Tank (Existing)	Unit Boundary	
Water - Culvert (As-Built)	Boundary - TOWNSHIP	
Water - Water Tank (As-Built)	Boundary - SECTION	
Cattleguard with Gate (Proposed)	POD Wildlife - 6/24/2010	
Cattleguard Only (Existing)	Wildlife - (1/2 Mile Buffer) Raptor	
Cattleguard Only (Proposed)	Wildlife - (2 Mile Buffer) Sage Grouse Lek	
Do Not Use Roads	Wildlife - (1/4 Mile Buffer) Sage Grouse Lek	
Compressor - Existing	Wildlife - (1/4 Mile Buffer) Burrowing Owl	
Vent - Blow Off (As-Built)	Wildlife - Prairie Dog Habitat	
Battery (As-Built)	Wildlife - (Active Failed) Burrowing Owl	
Valve - Water (As-Built)	Wildlife - (Active) Burrowing Owl	
Electrical Distribution Panel (As-Built)	Wildlife - (Inactive) Burrowing Owl	
Guy Anchor (As-Built)	Wildlife - (Unknown) Burrowing Owl	
Power Drop (As-Built)	Wildlife - (Active) Raptor	
Power - (Proposed) Feature	Wildlife - (Active) Sage Grouse Lek	
Mine Roads	Wildlife - (Did Not Locate) Raptor	
Road - Template (Proposed)	Wildlife - (Active False) Raptor	
Road - Primitive (Existing)	Wildlife - (Inactive) Raptor	
Road - Improved (Existing)	Wildlife - (Inactive) Sage Grouse Lek	
Road - Do Not Use (Existing)	Wildlife - (Inactive) Sharp Tall Lek	
Corridor - Utility (Existing)	Wildlife - (Other) Raptor	
Corridor - Engineered Road and Utility (Proposed)	Wildlife - (Unknown) Raptor	
Corridor - Template Road and Utility (Proposed)	Wildlife - (Unknown) Sage Grouse Lek	
Corridor - Utility (Proposed)	Wildlife - (Unknown) Sharp Tall Lek	
Corridor - Non-Federal Action (Proposed)		
FenceLine (Existing)		
Pipeline - Gas Line (As-Built)	BLM Legend	
Pipeline - Water Discharge Line (As-Built)	BUOW Nests	
Pipeline - Gas Line (Existing)	Raptor Nests	
Pipeline - Oil Production Line (As-Built)	Raptor_Nest_Buffer_HalfMile (Feb 1-July 31)	
Pipeline - Water Discharge Line (As-Built)	BUOW_Nest_Buff_QuarterMile (April 15-Aug 31)	
APC Pipeline: PRB Line, Table Mtn Lateral		
City Willow Pipeline		
Power - (As-Built) Overhead		
Power - (As-Built) Buried/Underground		
PRECorp Power - (Proposed) Overhead		
Power - (Proposed) Overhead		

NOTE:
Infrastructure shown in light gray is Approved by BLM.
Infrastructure shown in dark gray is Existing.
Infrastructure shown in brown is In-Process.

Western Burrowing Owls

The following conditions will alleviate impacts to burrowing owls:

1. No surface-disturbing activities shall occur within 0.25 mile of all identified prairie dog colonies, from 15 April through 31 August, annually, prior to a burrowing owl survey. This timing limitation will be in effect unless surveys determine that no burrowing owls are present. A 0.25 mile buffer will be applied if a burrowing owl nest is identified. Refer to the attached raptor protection buffer maps for affected wells and infrastructure.
 - a. Surveys shall be conducted by a biologist following BLM protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
 - b. If a burrowing owl nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.

Sage-Grouse

The following conditions will alleviate impacts to sage-grouse:

1. No surface-disturbing activities shall occur within sage-grouse habitat, from 15 March through 30 June, annually. This affects the following wells and associated infrastructure:

Township/Range	Section	Wells
T45N R77W T45N R76W	24	Access/utility corridor through the SE ¼ of Section 24
	18	18-14, 18-21, and 18-23
	19	Access/utility corridor in SE ¼ of Section 19
	20	Access/utility corridor in S 1/2 of Section 20
	21	21-12, 21-14, and 21-23
	22	22-12, 22-14, and 22-23
	27	27-14, 27-23, 27-32, and 27-41
	28	28-14, 28-23, 28-32, and 28-41
T44N R77W	33	The access/utility corridors to 28-14 and 14-23
	1	1-12, 1-32, and 1-43
	2	2-12 and 2-32
	3	3-32

2. Maximum design speed on all operator-constructed and maintained roads will not exceed 25 miles per hour except travel along roads within 1/2 mile of the Christensen Ranch 4 sage grouse lek located in. These roads will be posted at 10 mph. This will affect the roads in T45N, R76W, sections 19. Vehicles will not stop or passengers be outside of vehicles in the E ½ of Section 19.
3. Disruptive activity is restricted on or within a 0.25 mile radius of the perimeter of occupied or undetermined sage-grouse leks from 3:00 pm to 10:00 am from March 15-May15. “Disruptive activities are those that “...require people and/or activity to be in nesting habitats for a duration of 1 hour or more during a 24 hour period...” (BLM 2009). This condition applies to the Christensen Ranch 4 sage-grouse lek located within 0.25 mile of the access road passing through T45N, R76W, sections 19.

Water Management

1. Submit a copy of the site facility plans and proof of bonds for the Table Mountain Pump Station when available.
2. Equip stock water tanks with wildlife escape ramps and barrier’s per Idaho BLM Technical Bulletin 89-4.

Cultural

1. New ground disturbing activity for pipeline construction in eastern half of T45N R76W Section 6 will not be authorized pending additional cultural testing near cultural site 48JO1480. Pipeline reroute

may be necessary based on the testing results. If the pipeline can be kept within existing disturbance this testing will not be necessary. The pipeline route will be field reviewed at the pre-construction on-site.

2. Per the Programmatic Agreement between the Bureau of Land Management and the Wyoming State Historic Preservation Officer Regarding Mitigation of Adverse Effects to the Pumpkin Buttes Traditional Cultural Property from Anticipated Federal Minerals Development in Campbell County, Wyoming; Appendix A-G; Anadarko will operate under mitigation measures found in appendices A-G of the PA during all phases (drilling, construction, operation, reclamation, etc) of all approved wells in the Table Mountain 2 POD and their associated infrastructure (new surface disturbance to junction with existing disturbance) within T45N R76W Sections 26, 27, 28, 33 and 34.
3. All surface disturbing activity in the following areas will be monitored by a BLM cultural resource use permit (CRUP) holder or permitted crew chief. The Bureau has identified these areas as having a high potential for buried cultural deposits (areas containing alluvial deposits along Willow Creek). Some portions of the monitoring areas as described may lie outside alluvial deposits and exact monitoring areas are left to the discretion of the archeological monitor (as illustrated on cultural inventory report for the Table Mountain 2 POD). All monitored areas must be plotted on the map provided with the monitoring report. The submission of two copies of a monitoring report to BFO is required within 30 days of the completion of all monitoring work.
 1. Infrastructure along Willow Creek drainage (T45N R77W Sections 4, 9, 10, 14, 16)
 2. Infrastructure within the vicinity of eligible site 48JO1496 (T45N R77W Section 10).
 3. Infrastructure within the vicinity of eligible site 48JO1480 (T45N R76W Section 6).

PROGRAMMATIC

1. Channel Crossings:
 - Minimize channel disturbance as much as possible by limiting pipeline and road crossings.
 - Avoid running pipelines and access roads within floodplains or parallel to a stream channel.
 - Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM.
 - Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.
2. Low water crossings will be constructed at original streambed elevation in a manner that will prevent any blockage or restriction of the existing channel. Material removed will be stockpiled for use in reclamation of the crossings.

Vegetation

1. Weed educational material will be reviewed with operators during preconstruction on-site meetings with operators, subcontractors, and landowners and will also be attached to approved APDs and PODs.

STANDARD

General

1. All contractors/operators will have a complete copy of the approved APD/POD, including COAs, at

the drill site, during the construction of the roads and drill pad, the drilling of the well, completion of the well, and all other related construction activities.

2. A pre-construction field meeting shall be conducted prior to beginning any dirt work approved under this POD. The operator shall contact the BLM Authorized Officer Andy Perez @ NRS Phone number Here at least 4-days prior to beginning operations so that the meeting can be scheduled. The operator is responsible for having all contractors present (dirt contractors, drilling contractor, pipeline contractor, project oversight personnel, etc.) including the overall field operations superintendent, and for providing all contractors copies of the approved POD, project map and BLM Conditions of Approval pertinent to the work that each will be doing.
3. Approval of this APD does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease that would entitle the applicant to conduct operations thereon. In addition, approval of this APD does not imply that the operator has legal access to the drilling location. When crossing private surface 43 CFR 3814 regulations must be complied with and when crossing public surface off-lease the operator must have an approved right-of-way.
4. Confine all equipment and vehicles to the access road(s), pad(s), and area(s) specified in the approved APD or POD.
5. The approval of this project does not grant authority to use off lease Federal lands. No surface disturbing activity, or use of off-lease federal lands, is allowed on affected leases until right-of-way grants become effective which is the date signed by the authorized officer.
6. This POD is valid for two years from the date of approval or until the oil and gas lease expires/terminates, whichever occurs first. If this well intends to earn a lease extension, diligent operations (actual drilling) must be in progress over the lease expiration date, advance lease rentals must have been paid, and a letter stating drilling operations were in progress must be submitted to this office no later than five days past the expiration date. If the APD terminates, any surface disturbance created under the application must be reclaimed according to an approved plan.
7. The operator will be in compliance with all applicable local, state and/or federal laws, regulations, and/or statutes.
8. A progress report must be filed a minimum of once a month starting with the month the well was spudded continuing until the well is completed. The report must be filed by the 25th of each month on a Sundry Notice (Form 3160-5). The report will include the spud date, casing information such as size, grade, weight, hole size, and setting depth, amount and type of cement used, top of cement, depth of cementing tools, casing test method, intervals tested, perforated, acidized, fractured and results obtained and the dates all work done.
9. In the event abandonment of the hole is desired, an oral request may be granted by this office but must be timely followed within 5 days with a "Notice of Intention to Abandon" (Form 3160-5). The "Subsequent Report of Abandonment" (Form 3160-5) must be submitted within 30 days after the actual plugging of the well bore, reporting where the plugs were placed, and the current status of the surface restoration.
10. Whether the well is completed as a dry hole or as a producer, two copies of all logs run, core descriptions, core analysis, well-test data, geologic summaries, sample descriptions, and all other surveys or data obtained and compiled during the drilling, work over, and/or completion operations will be filed with Form 3160-4. A gamma ray log shall be run from T.D. to ground surface.

11. The operator is responsible for informing all persons associated with this project that they shall be subject to prosecution for damaging, altering, excavating or removing any archaeological, historical, or vertebrate fossil objects on site. If archaeological, historical, or vertebrate fossil materials are discovered, the operator is to suspend all operations that further disturb such materials and immediately contact the Authorized Officer. Operations are not to resume until written authorization to proceed is issued by the Authorized Officer.
12. Within five (5) working days, the Authorized Officer will evaluate the discovery and inform the operator of actions that will be necessary to prevent loss of significant cultural or scientific values.
13. The operator is responsible for the cost of any mitigation required by the Authorized Officer. The Authorized Officer will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the Authorized Officer that the required mitigation has been completed, the operator will be allowed to resume operations.
 - a. If any cultural values [sites, artifacts, human remains (Appendix L FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. The authorized officer will conduct an evaluation of the cultural values to establish appropriate mitigation, salvage or treatment. The operator is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are uncovered during construction, the operator is to immediately stop work that might further disturb such materials, and contact the authorized BLM officer (AO). Within five working days the AO will inform the operator as to:
 - whether the materials appear eligible for the National Register of Historic Places;
 - the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
 - a time-frame for the AO to complete an expedited review under 36 CFR 800.11 to confirm, through the State Historic Preservation Officer, that the findings of the AO are correct and that mitigation is appropriate. The AO will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction measures.
 - b. If paleontological resources, either large or conspicuous, and/or a significant scientific value are discovered during construction, the find will be reported to the Authorized Officer immediately. Construction will be suspended within 250 feet of said find. An evaluation of the paleontological discovery will be made by a BLM approved professional paleontologist within five (5) working days, weather permitting, to determine the appropriate action(s) to prevent the potential loss of any significant paleontological values. Operations within 250 feet of such a discovery will not be resumed until written authorization to proceed is issued by the Authorized Officer. The applicant will bear the cost of any required paleontological appraisals, surface collection of fossils, or salvage of any large conspicuous fossils of significant scientific interest discovered during the operation.
14. The operator shall be responsible for the prevention of fires on public lands caused by its employees, contractors or subcontractors. During conditions of extreme fire danger, surface use operations may be limited or suspended in specific areas.
15. All survey monuments found within the area of operations shall be protected. Survey monuments include, but are not limited to: General Land Office and Bureau of Land Management Cadastral

Survey Corners, reference corners, witness points, U. S. Coast and Geodetic benchmarks and triangulation stations, military control monuments, and recognizable civil (both public and private) survey monuments. In the event of obliteration or disturbance of any survey monuments, the incident shall be reported in writing to the Authorized Officer.

16. If any time the facilities located on public lands authorized by the terms of the lease are no longer included in the lease (due to a contraction in the unit or other lease or unit boundary change) the BLM will process a change in authorization to the appropriate statute. The authorization will be subject to appropriate rental, or other financial obligation determined by the authorized officer.
17. Gas produced from this well may not be vented or flared beyond an initial authorized test period of 30 days or 50 MMCF following its completion, whichever first occurs, without the prior written approval of the authorized officer. If gas is vented or flared without approval beyond the test period authorized above, you may be directed to shut-in the well until the gas can be captured or approval to continue venting or flaring as uneconomic is granted. You shall be required to compensate the lessor for that portion of the gas vented or flared without approval which is determined to have been avoidably lost.
18. The first producing well drilled to each targeted coal zone will be designated as the POD "Reference Well". Reference wells will not be required for PODs within a 6 mile radius of the first reference well designated by the operator, nor for co-mingled coal zones. The designated reference well must be equipped to be sampled at the well head. A reference well sample will be collected from the wellhead and submitted for analysis; using the list of analytes identified in WDEQ WYPDES Application for Permit to Surface Discharge Produced Water from CBM New Discharges, Renewals, or Major Modifications, within 30 to 60 days of initial water production. Results of the analysis will be submitted to the BFO-BLM authorized Officer as they become available and will include the following information: Operator Name, POD Name, Well Name and location and Date Sampled.
19. By November 1 each year, companies will submit the following information, attached to a Sundry Form 3160-5, where construction and development have taken place in the last year.
 - Georeferenced spatial data depicting as-built locations of all facilities, wells, roads, pipelines, power lines, reservoirs, discharge points, and other related facilities to the BLM for all PODs.
 - Two as-built copies of Map D.
20. If any dead or injured threatened, endangered, proposed, or candidate species is located during construction or operation, the U.S. Fish and Wildlife Service's Wyoming Field Office (307-772-2374), their law enforcement office (307-261-6365), and the BLM Buffalo Field Office (307-684-1100) shall be notified within 24 hours. If any dead or injured sensitive species is located during construction or operation, the BLM Buffalo Field Office (307-684-1100) shall be notified within 24 hours.
21. Operators shall comply with all other conservation measures and terms and conditions identified in the Powder River Basin Oil and Gas Project Biological Opinion (ES-6-WY-07-F012).
22. If an undocumented raptor nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.

DRILLING AND PRODUCTION OPERATIONS

1. The spud date will be reported electronically, (see website location above) to the Authorized Officer 24 HOURS BEFORE SPUDDING, unless otherwise required in site specific conditions of approval.

Spud Notice Site:

http://www.wy.blm.gov/minerals/og/og_notices/spud_notice.php

2. The operator shall complete coal bed natural gas wells (case, cement and under ream) as soon as possible, but no later than 30 days after drilling operations, unless an extension is given by the BLM Authorized Officer.

Well Control Equipment

1. The well control equipment approved in this project lists the minimum requirements.
2. The flow line shall be a minimum of 30 feet from the well bore and securely anchored. The 30-foot length of line is a minimum and operators must make consideration for increasing this length for topography and/or wind direction.
3. The flow line shall be a straight run.
4. The flow line must be constructed from non-flammable material.
5. All cuttings and circulating medium shall be directed to and contained in a reserve pit.
6. The nearest edge of the pits shall be a minimum of 25' from the rig.
7. A minimum of 2' of freeboard shall be maintained in the pits at all times.
8. The authorized officer may modify these requirements at any time if it is determined that increased pressure control is deemed necessary.
9. Verbal notification shall be given to the Authorized Officer at least 24 hours before formation tests, BOP tests, running and cementing casing, and drilling over lease expiration dates.

Casing Program

1. The minimum requirement for casing centralizers is as follows: all casing strings will have centralizers on the bottom three joints (i.e. a minimum of one centralizer per joint starting with the shoe joint).
2. In addition, the production casing string shall be centralized with API approved centralizers using the following specifications:
 - 1.1. One centralizer per~120'(specifically every third or fourth joint depending on joint length).
 - 1.2. One centralizer 25' above surface casing shoe.
3. Surface casing length shall follow current requirements set forth by the WOGCC. Increased surface casing may be required so that the surface casing shoe may be set into a competent formation.

Cement Program

1. If there are indications of inadequate primary cementing of the surface, intermediate, or production casing strings; such as but not limited to no returns to surface, cement channeling, fallback or mechanical failure of equipment, the operator will evaluate the adequacy of the cementing operations. This evaluation will consist of running a cement bond log (CBL) or an alternate method approved by the Authorized Officer (AO) no sooner than 12 hours and no later than 24 hours from the time the cement was first pumped.
2. If the evaluation indicates inadequate cementing, the operator shall contact a BLM Buffalo Field Office Petroleum Engineer for approval of remedial cementing work. Remedial cementing will consist of, but may not be limited to:
 - 2.1. Perforating and squeezing cement to ground surface should the top of cement (TOC) be below the surface casing shoe. This shall be done within 36 hours of the completion of pumping the primary cement job.
 - 2.2. One-inching cement to ground surface should the top of cement (TOC) be above the surface casing shoe.
 - 2.3. Fallback that is found to be less than 30' from ground surface may be topped off with cement slurry.
3. The adequacy of the remedial cementing operations shall be verified by a cement bond log (CBL) or an alternate method approved by the Authorized Officer (AO). All remedial work shall be completed and verified prior to drilling out the casing shoe or perforating the casing for purposes other than remedial cementing.
4. The cement mix water used must be the same water used to develop the cement program and be of adequate quality, so as not to degrade the setting properties. Waters containing high carbonates or bicarbonates (greater than 2,000 ppm) should be avoided.

Production Equipment

1. All gas measurement equipment that deviates from Onshore Order #5 (or WY NTL 2004-1 in the case of electronic flow computers) shall be approved via a Notice of Intent sundry (Form No. 3160-5) prior to installation and use. This includes any type of primary device other than a standard orifice plate meter. Requests for a variance from the minimum standards of Onshore Order #5 must list:

The specific type of equipment.

How this equipment will meet or exceed the requirements of Onshore Order #5.

The location, specific well and lease number where the equipment will be used.

2. An appropriate pressure gauge is required to be installed on each casing annulus to monitor this pressure.
3. Other actions such as off-lease measurement, commingling, allocation, etc. shall be approved via a Notice of Intent sundry (Form No. 3160-5). Submission of additional information in the POD shall not be construed as permission for these items. If the operator wishes to utilize off-lease gas measurement for wells approved in this POD, they are required to obtain approval via a Notice of Intent sundry (Form No. 3160-5) prior to any gas production. A map shall be attached to the sundry

that delineates where the individual wells will be measured for federal royalty. Unless this POD is committed to a Federal Oil & Gas Unit or Agreement, the production from all Federal wells shall be measured for Federal royalty prior to being combined with production from any other Federal, Indian, or non-Federal leases.

Well and POD Building Identification

1. From the time a well pad is constructed or a well is spudded (if no well pad needed), until abandonment, all well locations must be properly identified with a legible sign. The sign will include the well name and number, operator name, lease number, and the surveyed location.
2. At each POD building site where federal wells are metered, the operator is required to maintain a legible sign displayed in a conspicuous place. This sign is required to be in place at the time metering goes online. The sign shall include: POD name, Operator, Federal well names and numbers, Federal lease numbers being metered at the POD building, and surveyed location of the building.

Protection of Fresh Water Resources

1. All oil and gas operations shall be conducted in a manner to prevent the pollution of all freshwater resources. All fresh waters and waters of present or probable future value for domestic, municipal, commercial, stock or agricultural purposes will be confined to their respective strata and shall be adequately protected. Special precautions will be taken to guard against any loss of artesian water from the strata in which it occurs and the contamination of fresh water by objectionable water, oil, condensate, gas or other deleterious substance to such fresh water.

Miscellaneous Conditions

1. Any changes to the approved drilling plan and/or these conditions of approval shall be approved by the BLM-Buffalo Field Office Petroleum Engineer prior to being implemented.

After hour's numbers:

Petroleum Engineer: Matthew Warren

Home Telephone: 307-620-0103

Petroleum Engineer: James Evans

Home Telephone: 307-331-5421

2. If any cores are collected, a copy of all analysis performed shall be submitted to the BLM-Buffalo Field Office Petroleum Engineer.

SURFACE USE STANDARD

Construction

1. Prior to construction, the operator will remove all staking (engineered road, pads, well stakes, etc.) for those areas which were not approved with the POD/APD.
2. All roads, well pads, rig slots, culverts, spot upgrades and locations where engineered construction will occur will be completely slope staked for review prior to construction.
3. Topsoil will be segregated for all excavation including the entire disturbance area for constructed pads and excavated areas for rig leveling, reserve pits, constructed roads, spot upgrades, reservoir upgrades, outfalls and utility trenches and redistributed for interim reclamation activities. This requirement will not be applied for pipelines installed with wheel trenchers.
4. The operator will not push soil material and overburden over side slopes or into drainages. All soil material disturbed will be placed in an area where it can be retrieved without creating additional undue surface disturbance and where it does not impede watershed and drainage flows.
5. Maintain a minimum 20-foot undisturbed vegetative border between disturbance areas and the edge of adjacent drainages, unless otherwise directed by the BLM Authorized Officer.
6. Reserve pits will be adequately fenced during and after drilling operations until pit is reclaimed so as to effectively keep out wildlife and livestock. Adequate fencing, in lieu of more stringent requirements by the surface owner, is defined as follows:
 7. Construction materials will consist of steel or wood posts. Three or four strand wire (smooth or barbed) fence or hog panel (16-foot length by 50-inch height) or plastic snow fence must be used with connectors such as fence staples, quick-connect clips, hog rings, hose clamps, twisted wire, etc. Electric fences will not be allowed.
 8. Construction standards: Posts shall be firmly set in ground. If wire is used, it must be taut and evenly spaced, from ground level to top wire, to effectively keep out animals. Hog panels must be tied securely into posts and one another using fence staples, clamps, etc. Plastic snow fencing must be taut and sturdy. Fence must be at least 2-feet from edge of pit. 3 sides fenced before beginning drilling, the fourth side fenced immediately upon completion of drilling and prior to rig release. Fence must be left up and maintained in adequate condition until pit is closed.
 9. The reserve pit will be oriented to prevent collection of surface runoff. After the drilling rig is removed, the operator may need to construct a trench on the uphill side of the reserve pit to divert surface drainage around it. If constructed, the trench will be left intact until the pit is closed.
 10. The reserve pit will be lined with an impermeable liner if permeable subsurface material is encountered. An impermeable liner is any liner having permeability less than 10^{-7} cm/sec. The liner will be installed so that it will not leak and will be chemically compatible with all substances that may be put in the pit. Liners made of any man-made synthetic material will be of sufficient strength and thickness to withstand normal installation and pit use. In gravelly or rocky soils, a suitable bedding material such as sand will be used prior to installing the liner.
 11. The reserve pit will be constructed so that at least half of its total volume is in solid cut material (below natural ground level).

12. The culvert locations will be staked prior to construction. The culvert invert grade and finished road grade will be clearly indicated on the stakes. Culverts will be installed on natural ground, or on a designed flow line of a ditch. The minimum cover over culverts will be 12” or one-half the diameter whichever is greater. Drainage laterals in the form of culverts or waterbars shall be placed according to the following spacing:

Soil Type	Road Grade 2-4%	Road Grade 5-8%	Road Grade 9-12%	Road Grade 13-16%
Highly erosive Granitic or sandy	240	180	140	100
Intermediate Erosive clay or loam	310	260	200	150
Low erosive shale or gravel	400	325	250	175

13. Provide 4” of aggregate where grades exceed 8%. Surface material must meet requirements set forth in Wyoming Supplement to BLM Road Manual 9113.
14. The minimum diameter for culverts will be 18 inches. However, all culverts will be appropriately sized in accordance with standards in BLM Manual 9113 or at the discretion of the Authorized Officer.
15. Maximum speed on all operator-constructed and maintained roads will not exceed 25 miles per hour.
16. Pipeline construction shall not block nor change the natural course of any drainage. Pipelines shall cross perpendicular to drainages. Suspended pipelines shall provide adequate clearance for maximum runoff.
17. During construction, emissions of particulate matter from well pad and road construction would be minimized by application of water or other non-saline dust suppressants with at least 50 percent control efficiency. Dust inhibitors (surfacing materials, non-saline dust suppressants, and water) will be used as necessary on unpaved roads that present a fugitive dust problem. The use of chemical dust suppressants on public surface will require prior approval from the BLM Authorized Officer.
18. All overhead power lines will be constructed to Avian Power Line Interaction Committee (2006 edition or most recent edition) by the standards and additional standards identified in the PRB FEIS Biological Opinion (Volume 3, Appendix K, page 43).

Operations/Maintenance

1. All waste, other than human waste and drilling fluids, will be contained in a portable trash cage. This waste will be transported to a State approved waste disposal site immediately upon completion of drilling operations. No trash or empty barrels will be placed in the reserve pit or buried on location. Operators and their contractors will comply with all state and local laws and regulations pertaining to disposal of human and solid waste will be complied with.
2. Sewage shall be placed in a self-contained, chemically treated porta-potty on location.
3. The operator and their contractors shall ensure that all use, production, storage, transport and disposal of hazardous and extremely hazardous materials associated with the drilling, completion and production of these wells will be in accordance with all applicable existing or hereafter promulgated federal, state and local government rules, regulations and guidelines. All project-related activities

involving hazardous materials will be conducted in a manner to minimize potential environmental impacts. In accordance with OSHA requirements, a file will be maintained onsite containing current Material Safety Data Sheets (MSDS) for all chemicals, compounds and/or substances which are used in the course of construction, drilling, completion and production operations.

4. Produced fluids shall be put in test tanks on location during completion work. Produced water will be put in the reserve pit during completion work per Onshore Order #7.
5. The only fluids/waste materials which are authorized to go into the reserve pit are RCRA exempt exploration and production wastes. These include:
 - drilling muds & cuttings
 - rigwash
 - excess cement and certain completion & stimulation fluids defined by EPA as exempt

It does not include drilling rig waste, such as:

- spent hydraulic fluids
- used engine oil
- used oil filter
- empty cement, drilling mud, or other product sacks
- empty paint, pipe dope, chemical or other product containers
- excess chemicals or chemical rinsate

Any evidence of non-exempt wastes being put into the reserve pit may result in the BLM Authorized Officer requiring specific testing and closure requirements.

6. Reserve pits will be closed as soon as possible, but no later than 90 days from time of drilling/well completion, unless the BLM Authorized Officer gives an extension. Pits must be dry of fluids or they must be removed via vac-truck or other environmentally acceptable method prior to backfilling, re-contouring and replacement of topsoil. Mud and cuttings left in pit must be buried at least 3-feet below re-contoured grade. The operator will be responsible for re-contouring any subsidence areas that develop.
7. The fluids and mud must be dry in the reserve pit before re-contouring pit area. The operator will be responsible for re-contouring of any subsidence areas that develop from closing a pit before it is completely dry. The plastic pit liner (if any) will be cut off below grade and properly disposed of at a state authorized landfill before beginning to re-contour the site.
8. The operator will be responsible for prevention and control of noxious weeds and weeds of concern on all areas of surface disturbance associated with this project (well locations, roads, water management facilities, etc.) Use of pesticides shall comply with the applicable Federal and State laws.
9. Prior to the use of pesticides on public land, the holder shall obtain from the BLM authorized officer a pesticide use permit (PUP). The PUP must include a written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the authorized officer to such use.

Producing Well

1. Landscape those areas not required for production to the surrounding topography as soon as possible. The fluids and mud must be dry in the reserve pit before re-contouring pit area. The operator will be responsible for re-contouring and reseeded of any subsidence areas that develop.

2. Any spilled or leaked oil, produced water or treatment chemicals must be reported in accordance with NTL-3A and immediately cleaned up in accordance with BLM requirements. This includes clean-up and proper disposition of soils contaminated as a result of such spills/leaks.
3. Distribute stockpiled topsoil evenly over those areas not required for production (ie.,cut/fill slopes, road ditches, pipelines, etc.) and reseed with approved seed mix.
4. Upgrade and maintain access roads and drainage control (e.g., culverts, drainage dips, ditching, crowning, surfacing, etc.) as necessary and as directed by the BLM Authorized Officer to prevent soil erosion and accommodate safe, environmentally-sound access.

Reclamation/Dry Hole

1. BLM will not release the performance bond until all disturbed areas associated with the APD/POD have been successfully revegetated (evaluation will be made after the second complete growing season) and has met all other reclamation goals of the surface owner and surface management agency.
2. A Notice of Intent to Abandon and a Subsequent Report of Abandonment must be submitted for abandonment approval.
3. For performance bond release approval, a Final Abandonment Notice (with a surface owner release letter on split-estate) must be submitted prior to a final abandonment evaluation by BLM.
4. Phased reclamation plans will be submitted to BLM for approval prior to individual POD facility abandonment via a Notice of Intent (NOI) Sundry Notice. Individual facilities, such as well locations, pipelines, discharge points, impoundments, etc. need to be addressed in these plans as they are no longer needed. Individual items that will need to be addressed in reclamation plans include:
 - Configuration of reshaped topography, drainage systems, and other surface manipulations
 - Waste disposal
 - Revegetation methods, including specific seed mix (pounds pure live seed/acre) and soil treatments (seedbed preparation, fertilization, mulching, etc.). On private surface, the landowner should be consulted for the specific seed mix.
 - Other practices that will be used to reclaim and stabilize all disturbed areas, such as water bars, erosion fabric, hydro-mulching, etc.
 - An estimate of the timetables for beginning and completing various reclamation operations relative to weather and local land uses.
 - Methods and measures that will be used to control noxious weeds, addressing both ingress and egress to the individual well or POD.
 - Decommissioning/removal of all surface facilities
 - Closure and reclamation of areas utilized or impacted by produced CBNG water, including discharge points, reservoirs, off-channel pits, land application areas, livestock/wildlife watering facilities, surface discharge stream channels, etc.
 - Refer to *BLM Impoundment Reclamation Guidance* for further information on reclaiming impoundments.
 - Refer to the *Wyoming Reclamation Policy* for further guidance on reclamation.
5. All disturbed lands associated with this project, including the pipelines, access roads, water management facilities, etc will be reclaimed and reseeded within 180 days of well plugging. The reclamation work must be in accordance with the surface use plan and any pertinent site-specific COAs.

6. Disturbed lands will be re-contoured back to conform with existing undisturbed topography. No depressions will be left that trap water or form ponds.
7. The fluids and mud must be dry in the reserve pit before re-contouring pit area. The operator will be responsible for re-contouring of any subsidence areas that develop from closing a pit before it is completely dry. The plastic pit liner (if any) will be cut off below grade and properly disposed of at a state authorized landfill before beginning to re-contour the site.
8. Before the location has been reshaped and prior to redistributing the topsoil, the operator will rip or scarify the drilling area and access road on the contour to 4" below the compacted layer. The rippers are to be no farther than 24 inches apart.
9. Distribute the topsoil evenly over all disturbed areas. Prepare the seedbed and seed with approved seed mix.
10. Soil fertility testing and the addition of soil amendments may be required to stabilize some disturbed lands.
11. Any mulch utilized for reclamation needs to be certified weed free.
12. Waterbars are to be constructed at least one (1) foot deep, on the contour with approximately two (2) feet of drop per 100 feet of waterbar to ensure drainage, and extended into established vegetation. All waterbars are to be constructed with the berm on the downhill side to prevent the soft material from silting in the trench. The initial waterbar should be constructed at the top of the backslope. Subsequent waterbars should follow the following general spacing guidelines:

Slope (percent)	Spacing Interval (feet)
< 2	200
2 - 4	100
4 - 5	75
> 5	50

Appendix B: Affected Resource and Species Worksheets

Resource	Resource Present	Resource Affected	PRB FEIS Sufficient	Notes
Air quality	Yes	Yes	No	PRB FEIS: 3-291-298, 4-404-406, 4-377-386
Noise	Yes	Yes	No	
Cultural	Yes	Yes	No	PRB FEIS: 3-206-228, 4-273-288, 4-394
Native American religious concerns	Yes	Yes	No	PRB FEIS: 3-218-219, 3-228, 4-277-278
Traditional Cultural Properties	Yes	Yes	No	PRB FEIS: 3-218-219, 4-277-278
Mineral Potential				PRB FEIS: 3-66-70, 3-230, 4-127-129
Coal	Yes	No	No	PRB FEIS: 3-66
Fluid Minerals	Yes	Yes	No	PRB FEIS: 3-68-69
Locatable Minerals	Yes	Yes	No	
Other leasables	No	No	No	
Salable minerals	Yes	No	No	
Recreation				PRB FEIS: 3-263-273, 4-319-328
Developed site	No	No	No	PRB FEIS: 3-266, 4-326
Walk-in-Area	No	No	No	
Social & Economic				PRB FEIS: 3-275-289, 4-336-370
Environmental Justice	No	No	No	PRB FEIS
Transportation	Yes	No	No	
Soils & Vegetation				PRB FEIS: 3-78-107, 4-134-152, 4-153-164, 4-393-394, 4-406
Erosion Hazard	Yes	Yes	No	PRB FEIS: 3-82, 4-135
Poor Reclamation Potential	Yes	Yes	No	PRB FEIS: 3-86, 4-149-152
Slope hazard	Yes	Yes	No	PRB FEIS: 3-81, 4-135
Forest products	No	No	No	
Prime and Unique Farmland	No	No	No	PRB FEIS
Invasive Species	Yes	Yes	No	PRB FEIS: 3-103-108, 4-153-172
Wetlands/Riparian	Yes	No	Yes	PRB FEIS: 4-117-124, 3-108-113, 4-172-178, 4-406
Special Designations				
Proposed ACEC	No	No	No	PRB FEIS
Wild & Scenic River	No	No	No	PRB FEIS: 3-273
Wilderness Characteristics/Citizen	No	No	No	PRB FEIS
WSA	No	No	No	
Visual Resources				PRB FEIS: 3-252-263, 4-302-314, 4-403
Class II	No	No	No	
Class III	No	No	No	
Water				PRB FEIS: 3-1-56, 4-1-122, 4-135, 4-33, 4-405
Floodplains	No	No	No	PRB FEIS
Ground water	Yes	Yes	Yes	PRB FEIS: 3-1-30, 4-1-69, 4-392, 4-405
Surface water	Yes	Yes	Yes	PRB FEIS: 4-85-86, 4-117-124, 3-36-

Resource	Resource Present	Resource Affected	PRB FEIS Sufficient	Notes
				56. 4-69-122, 4-393, 4-405
Drinking water	Yes	Yes	Yes	PRB FEIS: 3-52, 4-50-52
Wildland Urban Interface				
Waste Management	Yes	Yes	Yes	PRB FEIS
Wildlife				PRB FEIS: 3-113-153, 4-179, 4-247, 4-397
ESA listed, proposed, or candidate species	Yes	Yes	Yes	PRB FEIS 4-251-273. Sage-grouse will be impacted.
BLM sensitive species	Yes	Yes	Yes	PRB FEIS 4/258-265
General wildlife	Yes	Yes	Yes	PRB FEIS 4-181-249
West Nile virus potential	No	No	No	PRB FEIS

Threatened, Endangered, Proposed, and Candidate Species Worksheet

Common Name	Habitat	Presence? (NP, NS, S, K)	Direct Impacts Anticipated?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
<i>Endangered</i>					
Black-footed ferret	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NP	No	No	4-251, BA & BO
Blowout penstemon	Sparsely vegetated, shifting sand dunes	NP	No	No	Not in FEIS
<i>Threatened</i>					
Ute ladies'-tresses orchid	Areas with appropriate hydrology	NP	No	No	4-253, BA & BO
<i>Proposed</i>					
Mountain plover	Short-grass prairie with slopes < 5%	NS	No	No	4-254, 4-255 & BA

Common Name	Habitat	Presence? (NP, NS, S, K)	Direct Impacts Anticipated?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
<i>Candidate</i>					
Greater sage-grouse	Basin-prairie shrub, mountain-foothill shrub	K	Yes	Yes	4-257 to 4-273

Sensitive Species worksheet

Common Name	Habitat	Presence ? (NP, NS, S, K)	Direct Impacts Anticipated ?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
<i>Amphibians</i>					4-258
Northern leopard frog	Beaver ponds and cattail marshes from plains to montane zones.	S	No	No	
Columbia spotted frog	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R drainage and tributaries.	NP	No	No	
<i>Fish</i>					4-259 & 4-260
Yellowstone cutthroat trout	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed	NP	No	No	
<i>Birds</i>					4-260 to 4-264
Baird's sparrow	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	NS	No	No	

Common Name	Habitat	Presence ? (NP, NS, S, K)	Direct Impacts Anticipated ?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
Bald eagle	Mature forest cover often within one mile of large water body with reliable prey source nearby.	K	No	No	4-251 to 4-253 & BA
Brewer's sparrow	Sagebrush shrubland	S	Yes	No	
Ferruginous hawk	Basin-prairie shrub, grasslands, rock outcrops	K	Yes	Yes	
Loggerhead shrike	Basin-prairie shrub, mountain-foothill shrub	S	No	No	
Long-billed curlew	Grasslands, plains, foothills, wet meadows	S	No	No	
Northern goshawk	Conifer and deciduous forests	NP	No	No	
Peregrine falcon	Cliffs	NP	No	No	
Sage sparrow	Basin-prairie shrub, mountain-foothill shrub	NS	No	No	
Sage thrasher	Basin-prairie shrub, mountain-foothill shrub	S	No	No	
Trumpeter swan	Lakes, ponds, rivers	NP	No	No	
Western Burrowing owl	Grasslands, basin-prairie shrub	K	Yes	Yes	
White-faced ibis	Marshes, wet meadows	NP	No	No	
Yellow-billed cuckoo	Open woodlands, streamside willow and alder groves	NS	No	No	
<i>Mammals</i>					4-264 & 4-265
Black-tailed prairie dog	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	K	Yes	No	4-255, 4-256
Fringed myotis	Conifer forests, woodland chaparral, caves and mines	NP	No	No	
Long-eared myotis	Conifer and deciduous forest, caves and mines	NP	No	No	
Spotted bat	Cliffs over perennial water.	NP	No	No	
Swift fox	Grasslands	S	Yes	No	

Common Name	Habitat	Presence ? (NP, NS, S, K)	Direct Impacts Anticipated ?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
Townsend's big-eared bat	Caves and mines.	NS	No	No	
Plants					4-258
Limber pine	Mountains, associated with high elevation conifer species	NP	No	No	
Porter's sagebrush	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	NP	No	No	
William's wafer parsnip	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	No	No	

Non-designated wildlife worksheet

Common Name / Group	Presence? (NP, NS, S, K)	Direct Impacts Anticipated?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
Big Game	K	Yes	No	4-181 to 4-215
Aquatics	K	Yes	No	4-235 to 4-249
Common Name / Group	Presence? (NP, NS, S, K)	Direct Impacts Anticipated?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
Migratory Birds	K	Yes	No	4-231 to 4-235
Raptors	K	Yes	Yes	4-216 to 4-221
Plains Sharp-tailed Grouse	NS	No	No	4-221 to 4-226

* NP = not present; NS = not suspected; S = suspected; K = known